

DOCKET SECTION

BEFORE THE
POSTAL RATE COMMISSION
WASHINGTON, D.C. 20268-0001

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POSTAL RATE COMMISSION
OFFICE OF THE SECRETARY

Postal Rate and Fee Changes, 1997)

Docket No. R97-1

OFFICE OF THE CONSUMER ADVOCATE
INTERROGATORIES TO UNITED STATES POSTAL SERVICE
(OCA/USPS-107-118)
November 12, 1997

Pursuant to sections 25 and 26 of the Rules of Practice of the Postal Rate Commission, Special Rule 2.E. and, to the extent applicable, Commission Order No. 1201 and rulings of the Presiding Officer, the Office of the Consumer Advocate ("OCA") hereby submits interrogatories and requests for production of documents. Instructions included with OCA interrogatories 1-7 to the United States Postal Service dated July 16, 1997, are hereby incorporated by reference.

Respectfully submitted,

Gail Willette

GAIL WILLETTÉ

Director

Office of the Consumer Advocate

Kenneth E. Richardson

KENNETH E. RICHARDSON
Attorney

OCA/USPS-107. Please refer to Library Reference H-148 and Library Reference H-149. These questions are based on the program MANL in Library Reference H-149, using data from Library Reference H-148. The program has been run on a personal computer, and the following printouts were generated and attached hereto: a copy of the program, Attachment 1; the program log, Attachment 2; and the program output, Attachment 3. In order to run the program a minor program modification was performed: the program was changed (lines 46 through 51 of the program log) to provide information to the program, in Attachment 1, on the location of the input data set in the Library Reference H-148. These questions refer to various parts of the program code in Part I of the program, listed in the program log, Attachment 2.

- a. After line 104 the data set OUT1 has 309 observations and four variables.
Please explain how the four variables were obtained—i.e. what data operations occurred and in what lines of code.
- b. Please name the four variables in OUT 1. Please name by order.
- c. What data operations occurred to result in 309 observations in OUT1: i.e., what operations occur on what variables, and where are the operations stated in the code?
- d. In line 103, what procedure is being performed with VAR TPH?
- e. For OUTPUT OUT=OUT1 N=N, line 104, please name the four variables.
- f. Please confirm that the 309 observations refer to 309 separate sites. If you do not confirm, please explain.

- g. What is the purpose of MODSET, created in line 110 but eliminated in line 116?
- h. What is the structure of MODSET: i.e., what are the variables by name, and how does the 309 observation, 4 variable data set OUT1 combine with OPER, consisting of 25,090 observations and 5 variables, to form a new database, as in line 109 of the code?
- i. On line 144 in the creation of the seasonal dummy variables, please provide a detailed explanation of exactly what type of calculation is being performed: i.e., in line 144, what number is produced and how is it calculated by the statement MOD(FYAP,100)?
- j. Please list the series of variables created by lines 144 through 156.
- k. After line 161 it is indicated that OPER has 23 variables. Please confirm this consists of the thirteen dummies, the two time variables, and the eight previous variables. If you do not confirm, please explain.
- l. In line 162, please name the variables for which means are being generated.
- m. In line 164 , where NOUT has 309 observations and 4 variables, please list the names of the variables, and their order in the file.
- n. For NOUT in line 164, please confirm that the 309 observations are from 309 sites. If you do not confirm, please explain.
- o. Please explain how the lines 162 through 164 computed the variables and observations.

OCA/USPS-108. Please refer to Library Reference H-148 and Library Reference H-149. These questions are based on the program MANL in Library Reference H-149, using data from Library Reference H-148. The program has been run on a personal computer, and the following printouts were generated and attached hereto: a copy of the program, Attachment 1; the program log, Attachment 2; and the program output, Attachment 3. In order to run the program a minor program modification was performed: The program was changed (lines 46 through 51 of the log) to provide information to the program, in Attachment 1, on the location of the input data set in the Library Reference H-148. These questions refer to various parts of the program code in Part II of the program, listed in the program log, Attachment 2.

- a. In line 179, does NN refer to a matrix? If so, please define the dimensions and variable names for rows and columns.
- b. In line 180 please define RHS.
- c. In line 183, does RZ refer to a matrix? If so, please define the dimensions and variable names for rows and columns.
- d. In line 185, does RY refer to a matrix? If so, please define the dimensions and variable names for rows and columns.
- e. On line 213, where LAGSET is defined, please provide dimensions of LAGSET.
- f. Please provide variable names for LAGSET by column or row as appropriate.
- g. Please provide information on the file structure of LAGSET.

OCA/USPS-109. Please refer to Library Reference H-148 and Library Reference H-149. These questions are based on the program MANL in Library Reference H-149, using data from Library Reference H-148. The program has been run on a personal computer, and the following printouts were generated and attached hereto: a copy of the program, Attachment 1; the program log, Attachment 2; and the program output, Attachment 3. In order to run the program a minor program modification was performed: The program was changed (lines 46 through 51 of the log) to provide information to the program, in Attachment 1, on the location of the input data set in the Library Reference H-148. These questions refer to various parts of the program code in Part III of the program, listed in the program log, Attachment 2.

- a. In line 231 MOUT1 is defined, and it has seven variables. Please list the names of the variables, and their order in the file.
- b. Please confirm that five of the variables for MOUT1 are listed in line 231. If you do not confirm, please explain.
- c. What are the other two variables for MOUT1?
- d. On line 236 the database OPER1 appears to be defined, with 24,781 observations and 20 variables. Please confirm that OPER1 was formed initially from LAGSET. If you do not confirm, please explain.
- e. It appears that 20 variables, defined in lines 236-257, were then added to the database. Please explain why OPER1 has 37, rather than 40, variables: i.e., which variables were redundant or removed.

- f. Please confirm that the deletion on line 259 of the file TEMP is in error, for apparently the file was not in existence. If you do not confirm, please explain.
- g. Lines 262 through 264 generate the data set NOUT with 309 observations and 4 variables. Please delineate the variables by name and order in the data set.
- h. Please confirm for the 309 observations that each observation contains means for a number of variables at a specific site, there being 309 sites. If you do not confirm, please explain.
- i. On lines 270-71 a regression is performed. Are the results printed in the output? If so, in reference to Attachment 3, please identify the section(s) of the page(s) where the information has been printed.
- j. Please confirm that the regression in lines 270-271 is a pooled regression. If you are unable to confirm, please explain.
- k. On Line 272 please define OLSEPS.
- l. OLSEPS appears to be a data set. Please define the dimensions and list the variables, and if it is not a data set, please define its structure.
- m. How was OLSEPS generated: i.e., what computations (please also reference code lines) resulted in its development?
- n. On Line 272 does R produce an analysis of the residuals? Is this printed in the printout? If so, please identify the section(s) of the page(s) where the information has been printed.
- o. On line 275, please define the dimensions and variables in ORESID?

- p. Please define the variables, variable order, and database structure of IDEPS, defined on line 276.
- q. Please explain the operations which generated IDEPS, referencing lines of code.
- r. Please define the variables and dimensions of PORESID.
- s. On line 277, for RCROSS which results from the merger of OLSEPS and IDEPS, please list in order the variables in RCROSS.
- t. Please define the dimensions of RCROSS.
- u. On line 281 for TIMEPS with 116 observations and 4 variables please define the variables by name in order and indicate which operations in which lines of code generated the data set.
- v. Please confirm that for PROC REG on line 285 that the data set input for the PROC REG is RBOTH. If you do not confirm, please explain.
- w. Are the results of the PROC REG on line 285 printed in the output? Please identify the section(s) of the page(s) where the information has been printed. If the information has not been printed, please state the reason.
- x. In line 298 it appears that BTSET has 309 observations and 8 variables. Please list the names of the variables and their order in the file.
- y. Please confirm that the 309 observations in BTSET correspond to 309 sites. If you do not confirm, please explain.

- z. On line 314 there is a PROC PRINT STATEMENT; please identify the section(s) of the page(s) where the information has been printed. If the information has not been printed, please state the reason.

OCA/USPS-110. Please refer to Library Reference H-148 and Library Reference H-149. These questions are based on the program MANL in Library Reference H-149, using data from Library Reference H-148. The program has been run on a personal computer, and the following printouts were generated and attached hereto: a copy of the program, Attachment 1; the program log, Attachment 2; and the program output, Attachment 3. In order to run the program a minor program modification was performed: The program was changed (lines 46 through 51 of the log) to provide information to the program, in Attachment 1, on the location of the input data set in the Library Reference H-148. These questions refer to various parts of the program code in Part IV of the program, listed in the program log, Attachment 2.

- a. In line 332, please define P.O.
- b. On line 332 is NN a data array? If so, please define the variables and dimensions.
- c. Please define the dimensions of Z and Y.
- d. Focusing on lines 335-337, it appears that the exogenous data from OPER1 are read into the program. Please confirm, or if unable to confirm please explain.

- e. If one wished to perform the analysis of Part IV excluding the independent variables MANR, MANR2, MANRTPH, TIM1TPH, TIM1MANR, TIME1, TIME12, TIME2TPH, TIME2MANR, TIME 2, TIME22, TPH1, TPH21, please confirm that one could simply exclude the variables from the input process in lines 335-337 and lines 435-436, accompanied by appropriate exclusionary procedures in lines 447-451? If you are unable to confirm, please explain.
- f. If one wished to perform the analysis of Part V excluding independent variables in a manner similar to (e), please confirm that one could simply exclude the variables from the input process in lines 488 through 491, with an appropriate exclusion in lines 585-589. If you are unable to confirm, please explain.
- g. If one had additional data and wished to add the data to the analysis, one could define a new data set—for sake of explication call it OPER1X—consisting of OPER1 plus additional data appropriately placed in the data set. With an expanded data set to consider additional variables, please confirm that one could simply modify the program lines--lines 335-337, 435-436, and 447-451-- to read in the additional data in the procedures in Part IV. If you are unable to confirm, please explain.
- h. A question on Part V of the program is inserted as a logical follow-on to (g). If one had additional data and wished to add the data to the analysis, one could define a new data set—for sake of explication call it OPER1X—consisting of OPER1 plus additional data appropriately placed in the data set. With an

expanded data set to consider additional variables, please confirm that one could simply modify the program lines—lines 488-491 and 585-589--to read in the additional data in the procedures in Part V. If you are unable to confirm, please explain.

- i. Please indicate where the output of the regression developed in lines 374 through 387 is printed in the output section, and where is the print command?
- j. In the program log, lines 396, through 400, it would appear that a number of matrices are created; please define the dimensions and variables for each matrix.
- k. Please define the dimensions and variable names in the vectors in lines 407, 408, and 409.
- l. On line 423 it is indicated that an output set is being created. Is the output set printed? Please identify the section(s) of the page(s) where the information has been printed. If the information has not been printed, please state the reason.
- m. On lines 452 through 456 are print statements. Please identify the section(s) of the page(s) where the information has been printed. If the information has not been printed, please state the reason.
- n. What is the purpose of the data set "COUNT" in line 461?
- o. What are the dimensions and variables in the data set "COUNT"?
- p. On line 465 please define NOUT in terms of dimensions and name of variables.

OCA/USPS-111. Please refer to Library Reference H-148 and Library Reference H-149. These questions are based on the program MANL in Library Reference H-149, using data from Library Reference H-148. The program has been run on a personal computer, and the following printouts were generated and attached hereto: a copy of the program, Attachment 1; the program log, Attachment 2; and the program output, Attachment 3. In order to run the program a minor program modification was performed: The program was changed (lines 46 through 51 of the log) to provide information to the program, in Attachment 1, on the location of the input data set in the Library Reference H-148. These questions refer to various parts of the program code in Part V of the program, listed in the program log, Attachment 2.

- a. Please turn to Part V of the program. In line 488, what is the variable or expression "INT": what does it accomplish?
- b. In line 496, what is the dimension of Y?
- c. A number of matrices appear to be created in line 501 through 530. Please give dimensions and variable names of the following:
 - i. line 502: K1;
 - ii. line 503: NT;
 - iii. line 504: N;
 - iv. line 505: TRZ;
 - v. line 506: TRY;
 - vi. line 510: TL;

- vii. line 515: FRST;
 - viii. line 516: OTHER;
 - ix. line 518: LAGOB;
 - x. line 520: FRSTY;
 - xi. line 521: OTHEY;
 - xii. line 522: LAGY;
- d. It appears that the order for the regression to be printed is in lines 590 through 595. For each line, please identify the section(s) of the page(s) where the information has been printed. If the information has not been printed, please state the reason.

OCA/USPS-112. Please turn to the program output, Attachment 3. A copy of the SAS output is attached, with the pages numbered 1 through 13. For each page in the program output (Attachment 3), certain lines of code in the SAS program (Attachment 1) generate the information printed. There is presumably a command that orders the printing of all or part of a page of program output for each part of the program output. For example, the output on page one would presumably have one or more print commands in the program, along with the SAS statements that generated the information. Similarly, for page 2, there would be a PROC REG command and accompanying print command in the program.

- a. In Attachment 3, please identify the relevant lines of code in the program log, page by page, for each of the thirteen pages in terms of:
 - i. the lines of code that generate the information that is printed; and
 - ii. the lines of code that order the printing of the information that is printed.
- b. Data files are an input to each of the procedures directed in the program lines of code in Attachment 1 that generate the output that is printed in Attachment 3. It is possible that one would wish to use the relevant data files to modify the analysis (i.e., run different regressions or use alternative analysis techniques), or one might even wish to modify the data files (to introduce or delete variables).
 - i. For each page of output, print command, and SAS code, please identify the input data files that were the basis for the part of the programs resulting in output and used to generate the information (except for cases where the information has been previously furnished.)
 - ii. Please confirm that if one wished to modify the procedure to eliminate variables from consideration this could this be accomplished by simply reading into the procedures identified in (i) only those variables which one wished to consider? If you are unable to confirm, please explain.

OCA/USPS-113. Please turn to the Program Output, Attachment 3. On page 2 (numbered in upper right corner) a regression is reported. In your testimony you refer to pooled, fixed effects, and random effects regressions.

- a. Please confirm that this a pooled regression. If you are unable to confirm, please explain.
- b. Please provide information on the line of program code where the regression procedure is initiated, the database used as an input to the procedure, the line of code for the printing of the regression output, and the location of the output in Attachment 3.

OCA/USPS-114. On page 3 of Attachment 3 (numbered in upper right corner) a regression is reported. In your testimony you refer to pooled, fixed effects, and random effects regressions.

- a. Please confirm that this a pooled regression. If you are unable to confirm, please explain.
- b. Please list the lines of code where the regression procedure is initiated, the database used as an input to the procedure, the line of code for the printing of the regression output, and the location of the output in Attachment 3.

OCA/USPS-115. On page 5 of Attachment 3 (numbered in upper right corner) a regression is reported.

- a. Please confirm that this is a fixed effects regression with no adjustment for auto correlation. If you are unable to confirm, please explain.
- b. Please list the lines of code where the regression procedure is initiated, the database used as an input to the procedure, the line of code for the printing of the regression output, and the location of the output in Attachment 3.

OCA/USPS-116. On page 8 of Attachment 3 (numbered in the upper right hand corner) a regression is reported.

- a. Please confirm that this is a fixed effects regression with an adjustment for autocorrelation. If you are unable to confirm, please explain.
- b. Please list the lines of code where the regression procedure is initiated, the database used as an input to the procedure, the line of code for the printing of the regression output, and the location of the output in Attachment 3.
- c. Please identify the location in Attachment 3 of R Squared for the regression.

OCA/USPS-117. You discussed random effects regressions in your testimony.

- a. Are any random effects regressions present in Attachment 3? Please delineate the output of the regression(s) by page and page location.
- b. If the answer to the main question is yes, please provide the numbers for the lines of code and databases(s) which are input to the regression.

OCA/USPS -118. In Library Reference H-149 referencing the program log from MANL in lines 250 through 257, a number of cross products are formed for subsequent inclusion in the regression analysis using a flexible translog functional form to approximate the true functional form of the cost equation. Please explain the economic basis for the variables and why they were developed and used.

```
*****; Attachment 1
*** THIS PROGRAM ESTIMATES THE VARAIBILITIES FOR MAIL PROCESSING LABOR ; Page 1 of 12
*** THE PROGRAM HAS FIVE PARTS ; To OCA/USPS-107-118
*** ;
*** PART I OF THIS PROGRAM READS IN THE DATA, SELECTS THE OPERATION TO ; ;
*** BE ESTIMATED AND CREATES THE TIME TREND AND SEASONAL VARIABLES ; ;
*** ;
*** PART II CREATES THE LAGGED VALUE FOR TPH FOR EACH SITE. BECAUSE OF ; ;
*** THE PANEL NATURE OF THE DATA THE LAGGING ; ;
*** MUST BE DONE SEPARATELY FOR EACH SITE ; ;
*** ;
*** PART III MEAN CENTERS THE DATA & CALCULATES THE INFORMATION REQUIRED ; ;
*** FOR THE GNR AND HAUSMAN TESTS ; ;
*** ;
*** PART IV ESTIMATES THE FIXED EFFECTS MODEL WITHOUT A SERIAL ; ;
*** CORRELATION CORRECTION, CALCULATES THE BFN DURBIN WATSON, ; ;
*** AND THE BLI RHO ; ;
*** ;
*** PART V ESTIMATES THE FIXED EFFECTS MODEL WITH THE SERIAL CORRELATION ; ;
*** CORRECTION IN PLACE. ; ;
*****;
```

```
*%%%%%%%%%%%%%%;*%
* PART I: THIS SECTION OF THE PROGRAM READS IN THE DATA, ; ;
* SELECTS THE OPERATION TO BE ESTIMATED AND CREATES THE ; ;
* TIME TREND AND SEASONAL VARIABLES ; ;
* THE INPUT VARIABLES ARE DEFINED AS FOLLOWS: ; ;
* THE 'T' PREFIX REFERS TO TPH AND THE 'H' PREFIX REFERS TO HOURS ; ;
* THE REMAING PORTIONS OF THE VARIABLE NAMES HAVE THE FOLLOWING DEFNS ; ;
* OCR - OCR OPERATION;
* BCS - BCS OPERATION;
* LSM - LSM OPERATION;
* MANL - MANUAL LETTER OPERATION;
* MANF - MANUAL FLAT OPERATION;
* FSB - FSM OPERATION;
* MANP - MANUAL PARCEL OPERATION;
* MECALLP - MECHANIZED PARCEL OPERATION;
* SPBALLP - SPBS NON-PRIORITY OPERATION;
* MANPRIO - MANUAL PRIORITY OPERATION;
* SPBPRI0 - SPBS PRIORITY OPERATION;
* IN ADDITION, MANR IS THE MANUAL LETTER RATIO AND MANFR IS THE
* MANUAL FLAT RATIO;
*%%%%%%%%%%%%%%;*%
*****;
```

```
*****Program MANL obtained from Libref 149;*****;
*****modified to locate data on Libref 148*****;
```

```
filename tre 't:\r97-1\libref\h-148\vvmpo.dat';
```

```
*****end modification of datafile location****;
```

```
DATA OPSTAGE; INFILE TRE;
INPUT IDNUM FYAP TOCR HOCR TBGS HBCS
```

TLSM HLSM TMANL HMANL TMANF HMANF
TFSB HFSB TMANP HMANP TMECALLP HMECALLP TSPBALLP HSPBALLP
TMANPRIO HMANPRIO TSPBPRI0 HSPBPRI0
TCANP HCANP
MANR MANFR;

Attachment 1
Page 2 of 12
to OCA/USPS-107-118

```
*****;  
*** THIS CODE DOUBLE CHECKS THE ELIMINATION OF DATA BEFORE 8801 ***;  
*** AND AFTER 9613 ***;  
*****;  
DATA OPSTAGE; SET OPSTAGE;  
IF FYAP LT 8801 THEN DELETE;  
IF FYAP GT 9613 THEN DELETE;  
*****;  
*** AT THIS POINT THE PROGRAM DEFINES THE OPERATION TO BE ESTIMATED ***;  
*****;  
DATA OPER; SET OPSTAGE;  
TPH=TMANL ;  
HRS=HMANL ;  
MANR=MANR ;  
TITLE1 ' MANUAL LETTER OPERATIONS/ HOURS ON TPH';  
TITLE2 'USING ONLY CONTINUOUS DATA FROM 8801-9613';  
TITLE3 'INCLUDING OFFICES @ LEAST 39 OBS/LAG MODEL';  
TITLE4 'USES 12 AP DUMMIES TO CAPTURE SEASONAL EFFECTS';  
*****;  
*** ELIMINATING UNUSED VARIABLES TO SAVE SPACE ***;  
*****;  
DATA OPER; SET OPER;  
KEEP IDNUM FYAP TPH HRS MANR ;  
*****;  
*** ELIMINATING DATA WITH MISSING TPH, HRS OR MANR ***;  
*****;  
DATA OPER MISSING;  
SET OPER;  
IF TPH=. OR TPH=0 OR HRS=. OR HRS=0 OR HRS<0 OR MANR=.  
THEN OUTPUT MISSING;  
ELSE OUTPUT OPER;  
*****;  
*** THIS WORK FILE NO LONGER NEEDED AND IS ELIMINATED TO SAVE SPACE ***;  
*****;  
PROC DATASETS LIBRARY=WORK;  
DELETE OPSTAGE;  
DATA OPER;SET OPER;  
*****;  
*** TO CHECK FOR DATA SUFFICIENCY THE PROGRAM IDENTIFIES ***;  
*** THE NUMBER OF OBS. PER SITE ***;  
*****;  
PROC MEANS NOPRINT;  
BY IDNUM;  
VAR TPH;  
OUTPUT OUT=OUT1 N=N;  
PROC SORT; BY IDNUM;  
*****;  
* ELIMINATING ANY SITES THAT DO NOT HAVE 39 OBS *;  
*****;
```

```

DATA OPER; MERGE OPER OUT1; BY IDNUM ;
  DATA MODSET; SET OPER;
  DATA OPER SHORT; SET MODSET;
  IF N< 39 THEN OUTPUT SHORT;
  IF N > 38 THEN OUTPUT OPER;
  PROC SORT DATA=OPER; BY IDNUM;
PROC DATASETS LIBRARY=WORK;
DELETE MODSET;
  DATA OPER; SET OPER;
  IF FYAP GT 9613 THEN DELETE;
  DATA OPER; SET OPER;
*****;
***      SETTING UP THE TIME TREND VARIABLES      ***;
*****;
IF FYAP LE 8813 THEN TIME1=FYAP-8801+1;
IF FYAP GE 8901 THEN TIME1=FYAP-8901+14;
IF FYAP GE 9001 THEN TIME1=FYAP-9001+27;
IF FYAP GE 9101 THEN TIME1=FYAP-9101+40;
IF FYAP GE 9201 THEN TIME1=FYAP-9201+53;
IF FYAP GE 9301 THEN TIME1=0;
IF FYAP GE 9401 THEN TIME1=0;
IF FYAP GE 9501 THEN TIME1=0;
*****;
IF FYAP LE 8813 THEN TIME2=0;
IF FYAP GE 8901 THEN TIME2=0;
IF FYAP GE 9001 THEN TIME2=0;
IF FYAP GE 9101 THEN TIME2=0;
IF FYAP GE 9201 THEN TIME2=0;
IF FYAP GE 9301 THEN TIME2=FYAP-9301+1;
IF FYAP GE 9401 THEN TIME2=FYAP-9401+14;
IF FYAP GE 9501 THEN TIME2=FYAP-9501+27;
IF FYAP GE 9601 THEN TIME2=FYAP-9601+40;
*****;
***      CREATING THE SEASONAL DUMMY VARIABLES      ***;
*****;
IF MOD(FYAP,100)=1 THEN AP01=1; ELSE AP01=0;
IF MOD(FYAP,100)=2 THEN AP02=1; ELSE AP02=0;
IF MOD(FYAP,100)=3 THEN AP03=1; ELSE AP03=0;
IF MOD(FYAP,100)=4 THEN AP04=1; ELSE AP04=0;
IF MOD(FYAP,100)=5 THEN AP05=1; ELSE AP05=0;
IF MOD(FYAP,100)=6 THEN AP06=1; ELSE AP06=0;
IF MOD(FYAP,100)=7 THEN AP07=1; ELSE AP07=0;
IF MOD(FYAP,100)=8 THEN AP08=1; ELSE AP08=0;
IF MOD(FYAP,100)=9 THEN AP09=1; ELSE AP09=0;
IF MOD(FYAP,100)=10 THEN AP10=1; ELSE AP10=0;
IF MOD(FYAP,100)=11 THEN AP11=1; ELSE AP11=0;
IF MOD(FYAP,100)=12 THEN AP12=1; ELSE AP12=0;
IF MOD(FYAP,100)=13 THEN AP13=1; ELSE AP13=0;
*****;
***      DETERMINING THE NUMBER OF OBS FOR EACH SITE (USED LATER IN THE ***;
***      MATRIX MANIPULATIONS).                                ***;
*****;
PROC SORT; BY IDNUM FYAP;
PROC MEANS NOPRINT;

```

Attachment 1
Page 3 of 12
to OCA/USPS-107-118

BY IDNUM; VAR TPH;
 OUTPUT OUT=NOUT N=N;

 **** PART II: USING PROC IML TO CREATE THE LAGGED DATA ;
 *** THE LAGGING MUST BE DONE SEPARATELY FOR EACH SITE BECAUSE OF THE ;
 *** PANEL NATURE OF THE DATA. ONCE THE LAGS ARE MADE FOR EACH SITE ;
 *** THEY ARE HORIZONTIALLY CONCATINATED WITH THE OTHER VARIABLES ;
 *** THE DATA FOR ALL SITES ARE THEN VERTICALLY CONCATINATED TO ;
 *** RECONSTRUCT THE PANEL DATA SET ;

 ***** START OF PROC IML *****;

 PROC IML;
 RESET AUTONAME ;
 START MAIN;
 USE NOUT VAR {N}; * READING IN THE # OF OBS PER SITE;
 READ ALL INTO NN ; * N IS NUMBER OF OBS PER SITE;
 *THE NEXT LINE READS IN DATA FOR THE RHS;
 USE OPER VAR {IDNUM FYAP TPH MANR TIME1 TIME2 AP02 AP03 AP04
 AP05 AP06 AP07 AP08 AP09 AP10 AP11 AP12 AP13 };
 READ ALL INTO RZ ;
 USE OPER VAR {HRS}; * READING IN THE DATA FOR THE DEP VAR;
 READ ALL INTO RY ;
 K1= NCOL(RZ); * Z AND K1 ARE FOR INTERCEPT FORM;
 NT= NROW(RY); * NT IS TOTAL NUMBER OF OBS.;
 N=NROW(NN);
 K2=K1+1;
 AUGZ=J(1,K2,{0}); AUGY=J(1,1,{0}); *ESTABLISH PLACEHOLDERS;
 IN1=0; IN2=0; *INITIALIZE POINTERS FOR LAGGING;
 DO S = 1 TO N BY 1;
 TL=NN(|S,|); *TL IS NUMBER OF RECORDS FOR A SITE;
 IN1=1 + IN2; IN2= TL + IN2;
 INYD1=IN1+1; INYD2=IN2-1;
 CZ1=RZ(|INYD1:IN2,|); *SECOND OB. THROUGH LAST OB.;
 LZ1=RZ(|IN1:INYD2,3|); *FIRST OB. THROUGH SECOND LAST OB.;
 CY1=RY(|INYD1:IN2,|); *SECOND OB. THROUGH LAST OB.;
 AUGY1=CY1;
 AUGZ1=CZ1||LZ1; *HORIZONTAL CONCATINATON OF MATRIX;
 AUGZ=AUGZ//AUGZ1; *VERTICAL CONCATINATION OF MATRIX;
 AUGY=AUGY//AUGY1;
 END;
 NTS=NT-N; NTS1=NTS+1; *NUMBER OF OBS DECREASED BY 1 PER SITE;
 AUGZ=AUGZ(|2:NTS1,|); *REMOVE PLACEHOLDER OBSERVATION;
 AUGY=AUGY(|2:NTS1,|);
 Z =AUGZ; Y=AUGY;
 NEW=AUGY||AUGZ; * COMBINE LHS AND RHS VARIABLES;
 VARN={'HRS' 'IDNUM' 'FYAP' 'TPH' 'MANR'
 'TIME1' 'TIME2' 'AP02' 'AP03' 'AP04' 'AP05' 'AP06'
 'AP07' 'AP08' 'AP09' 'AP10' 'AP11' 'AP12' 'AP13'
 'TPH1' }; *WRITING OUT THE NEW DATA SET;
 CREATE LAGSET FROM NEW (|COLNAME=VARN|);
 APPEND FROM NEW;
 SETOUT LAGSET;
 CLOSE LAGSET;

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MODEL HRS = TPH TPH2 MANR MANR2 MANRTPH;
 OUTPUT OUT=OLSEPS R=ORESID;
 PROC SORT DATA=OLSEPS; BY IDNUM;
 PROC MEANS NOPRINT DATA=OLSEPS; BY IDNUM;
 VAR ORESID;
 OUTPUT OUT=IDEPS MEAN=PORESID;
 DATA RCROSS; MERGE OLSEPS IDEPS; BY IDNUM;
 PROC SORT DATA=OLSEPS; BY FYAP;
 PROC MEANS NOPRINT DATA=OLSEPS; BY FYAP;
 VAR ORESID;
 OUTPUT OUT=TIMEPS MEAN=TRESID;
 PROC SORT DATA=RCROSS; BY FYAP;
 DATA RBOTH; MERGE RCROSS TIMEPS; BY FYAP;
 PROC SORT DATA=RBOTH; BY IDNUM FYAP;
 PROC REG;
 MODEL HRS = TPH TPH2 MANR MANR2 MANRTPH PORESID TRESID;
 T1: TEST PORESID;

 *** ESTIMATING THE BETWEEN OFFICE MODEL FOR HAUSMANN TEST ***;
 *** NOTE THAT THE AVG.TREND VARIABLES ARE INCLUDED AS EACH ***;
 *** SITE HAS ITS OWN AVERAGE DEGREE OF TECHNICAL PROGRESS ***;
 *** THE ESTIMATED COEFFICIENTS AND THE VARIANCE/COVARIANCE ***;
 *** MATRIX ARE SAVED FOR LATER CALCULATION OF HAUSMANN TEST ***;

 PROC SORT DATA=OPER1; BY IDNUM;
 PROC MEANS NOPRINT; BY IDNUM;
 VAR HRS TPH MANR TIME1 TIME2;
 OUTPUT OUT=BTSET MEAN= HRS TPH MANR TIME1 TIME2;
 DATA BTSET; SET BTSET;
 KEEP IDNUM HRS TPH MANR TIME1 TIME2;
 DATA BTREG; SET BTSET;
 TPH2=TPH**2;
 MANR2=MANR**2;
 MANRTPH=MANR*TPH;
 TIME22=TIME2**2;
 TIME12=TIME1**2;
 TIM1TPH=TIME1*TPH;
 TIM2TPH=TIME2*TPH;
 TIM1MANR=TIME1*MANR;
 TIM2MANR=TIME2*MANR;
 PROC REG DATA=BTREG OUTEST=BTWCOV COVOUT;
 MODEL HRS=TPH TPH2 MANR MANR2 MANRTPH TIM1TPH TIM1MANR
 TIME1 TIME12 TIM2TPH TIM2MANR TIME2 TIME22;
 PROC PRINT DATA=BTWCOV;
 DATA BTWCOV; SET BTWCOV;
 KEEP TPH TPH2 MANR MANR2 MANRTPH TIM1TPH TIM1MANR
 TIME1 TIME12 TIM2TPH TIM2MANR TIME2 TIME22;
 ;

 * PART IV USING PROC IML TO ESTIMATE THE FIXED EFFECTS MODEL ;
 * WITHOUT AN AUTOCORRELATION CORRECTION. USING THE RESIDUALS ;
 * FROM THAT MODEL FOR CALCULATING THE BFN DURBIN WATSON AND THE ;
 * BLI SERIAL CORRELATION PARAMETER (RHO) ;

```
***** START OF PROC IML *****;  
PROC IML;  
SHOW SPACE;  
RESET AUTONAME ;
```

Attachment 1
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```
START MAIN;  
USE NOUT VAR {N}; * READING IN THE # OF OBS PER SITE;  
READ ALL INTO NN; * N IS NUMBER OF TIME PERIOD PER P.O.;  
* READING IN THE DATA FOR RHS VARIABLES;  
USE OPER1 VAR  
{IDNUM TPH TPH2 MANR MANR2 MANRTPH TIM1TPH TIM1MANR TIME1 TIME12  
TIM2TPH TIM2MANR TIME2 TIME22 AP02 AP03 AP04 AP05 AP06 AP07  
AP08 AP09 AP10 AP11 AP12 AP13 TPH1 TPH21 };  
READ ALL INTO Z; * READING IN THE DATA FOR THE DEP VAR;  
USE OPER1 VAR {HRS};  
READ ALL INTO Y;  
NT= NROW(Y); *NT IS TOTAL NUMBER OF OBS.;  
N=NROW(NN);  
NTS=NT; NTS1=NTS+1;  
K1=NCOL(Z);  
X= Z(1,2:K1)); * X MATRIX HAS NO INTERCEPT;  
K= NCOL(X);  
N= NROW(NN); * N IS TOTAL NUMBER OF SITES;  
N1=N+{1};  
DFE = NTS - N -K;  
XDX= J(K,K,{0});  
XDY= J(K,1,{0});  
DX= J(1,K,{0}); * INITIALIZING THE PLACE HOLDERS;  
DY= J(1,1,{0});  
I1={0};  
I2={0};  
DO S={1} TO N BY{ 1};  
T = NN(|S,|); * NUMBER OF OBS FOR SITE i;  
I1={ 1}+I2; * IDENTIFYING THE 1ST OBS FOR SITE i;  
I2=T+I2; * IDENTIFYING THE LAST OBS FOR SITE i;  
X1= X(|I1:I2,|); * ISOLATING SITE i'S DATA;  
Y1= Y(|I1:I2,|);  
JT1= J(T,1,{1});  
IT= I(T);  
D = IT - JT1*JT1`/T; * REMOVING THE SITE SPECIFIC EFFECTS;  
DX1=D*X1;  
DY1=D*Y1;  
XDX=XDX+X1`*DX1;  
XDY=XDY+X1`*DY1;  
DX=DX//DX1; * VERTICALLY CONCATINATING THE DATA;  
DY=DY//DY1;  
END;  
DX= DX(|2:NTS1,|); * ELIMINATING THE PLACEHOLDER OBS;  
DY= DY(|2:NTS1,|);  
B_F= SOLVE(XDX,XDY); * FIXED EFFECTS ESTIMATOR; B_F=INV(XDX)*XDY ;  
RES_F = DY - DX*B_F; * FIXED EFFECTS RESIDUALS;  
SSE_F = RES_F`*RES_F; * FIXED EFFECTS SUM OF SQUARED ERR;  
S2 = SSE_F/DFE; * FIXED EFFECTS REGRESSION VARIANCE;  
SER= SQRT(S2); * FIXED EFFECTS STD ERROR OF THE REGRESSION;
```

VCV = INV(XDX) # S2; * FIXED EFFECTS VAR/COVAR MATRIX; Attachment 1
 YBAR = Y(|+,|)/NTS; * CALCULATING PSEUDO R2; Page 8 of 12
 YDEV = Y - YBAR; to OCA/USPS-107-118
 YSQR = YDEV`*YDEV;
 R2 = {1} - ((SSE_F)/YSQR);
 STD_F= SQRT(VECDIAG(S2* INV(XDX))); * CALCULATES STD ERR OF ESTIM.;
 TTEST_F= B_F/STD_F; * T-STAT OF COEFFICIENTS;
 B_FIXED= B_F||TTEST_F;
 NK1 = N*K1;
 ****;
 *** CALCULATING THE BFN DW AND THE BALTAGI-LI RHO ***;
 *** THESE CALCULATIONS REQUIRE FIRST IDENTIFYING THE RESIDUALS ***;
 *** BY SITE AND THEN CREATING A SET OF LAGGED RESIDUALS BY SITE ***;
 *** FINALLY THE CURRENT AND LAGGED RESIDUALS ARE PUT INTO THE ***;
 *** APPROPRIATE FORMULAS ***;
 ****;
 R=RES_F;
 BIFR=J(1,1,0); * CREATING PLACEHOLDER MATRICES;
 BCUR=J(1,1,0);
 BLAG=J(1,1,0);
 BN1=0;
 BN2=0;
 DO S=1 TO N BY 1; * IDENTIFYING THE RESIDUALS BY SITE;
 BL=NN(|S,|)-1; * SETTING THE RESIDUAL VECTOR SIZE;
 BN1=1+BN2;
 BN2=BL+BN2;
 BND1=BN1+1;
 BND2=BN2-1;
 BR1=R(|BND1:BN2,|); * CREATING THE VECTOR OF CURRENT RESIDUALS;
 LB1=R(|BN1:BND2,|); * CREATING THE VECTOR OF LAGGED RESIDUALS;
 BIFR1=BR1-LB1; * CREATING THE VECTOR OF DIFFERENCE RESIDUALS;
 BCUR1=BR1;
 BLAG1=LB1;
 BIFR=BIFR//BIFR1; *CONCATINATING THE RESIDUAL VECTORS;
 BCUR=BCUR//BCUR1;
 BLAG=BLAG//BLAG1;
 END;
 BIFR=BIFR;
 BCUR=BCUR;
 BLAG=BLAG;
 BCURLAG=BCUR`*BLAG;
 SMSQBF=BIFR`*BIFR;
 BFN=SMSQBF/SSE_F; * CALCULATING THE BFN & BLI STATISTICS;
 BLI=BCURLAG/(BLAG`*BLAG);
 ****;
 *** END OF BFN/BLI CALCULATION ***;
 *** CREATE OUTPUT SET FOR BLI STATISTIC ***;
 ****;
 VARN2={'BLI'};
 CREATE BLIOUT FROM BLI (|COLNAME=VARN2|);
 APPEND FROM BLI;
 SETOUT BLIOUT;
 CLOSE BLIOUT;
 ****;

```

*** CALCULATING THE HAUSMAN H STATISTIC ****; Attachment 1
*****; Page 9 of 12
USE BTWCOV VAR{TPH TPH2 MANR MANR2 MANRTPH TIM1TPH TIM1MANR to OCA/USPS-107-118
      TIME1 TIME12 TIM2TPH TIM2MANR TIME2 TIME22};
READ ALL INTO BTW;
BB = BTW(|1,|);
BTCV = BTW(|3:15,|);
BF = B_F(|1:13,|);
FCV = VCV(|1:13,1:13|);
H1 = BF` - BB;
H2 = INV(FCV + BTCV);
H3 = BF - BB`;
H = H1 * H2 * H3;
***** PRINTING OF OUTPUT ****;
RF={ 'TPH' 'TPH2' 'MANR' 'MANR' 'MANRTPH' 'TIME1TP' 'TIM1MAN'
     'TIME1' 'TIME12' 'TIME2TP' 'TIM2MAN' 'TIME2' 'TIME22'
     'AP02' 'AP03' 'AP04' 'AP05' 'AP06' 'AP07' 'AP08' 'AP09'
     'AP10' 'AP11' 'AP12' 'AP13'
     'TPH(-1)' 'TPH2(-1)'};

PRINT N ;
PRINT B_FIXED(| ROWNAME=RF|);
PRINT R2, S2, SER, NT, NTS, BFN;
PRINT BLI;
PRINT H;
FINISH MAIN;
RUN MAIN;
DATA OPER1; SET OPER1;
INT=1;
DATA COUNT; SET OPER1;
PROC MEANS NOPRINT;
BY IDNUM;
VAR TPH;
OUTPUT OUT=NOUT N=N;
PROC DATASETS LIBRARY=WORK;
DELETE COUNT;
;
*****;
* PART V: ESTIMATING THE FIXED EFFECTS MODEL WITH THE SERIAL ; ;
* CORRELATION CORRECTION IN PLACE. THE TRANSFORMATION IS DIFFERENT ; ;
* FOR THE FIRST OBSERVATION FOR EACH SITE THAN THE REMAINING ; ;
* OBSERVATIONS ; ;
*****;
*** RE-ENTER PROC IML AND USE BLI RHO FOR SERIAL CORRELATION ***;
*** CORRECTION IN PLACE. THE FIRST LINE IS USED TO ENSURE ***;
*** THERE IS ENOUGH SPACE TO ESTIMATE EQUATIONS ***;
*****;
PROC IML SYMSIZE=600000 WORKSIZE=6000000;
SHOW SPACE;
RESET AUTONAME;
START MAIN;
USE NOUT VAR {N};      * READING IN THE # OF OBS PER SITE;
READ ALL INTO NN;      * N IS THE NUMBER OF TIME PERIODS PER SITE;
*READING IN THE DATA FOR THE RHS VARIABLES;

```

```
{INT TPH TPH2 MANR MANR2 MANRTPH TIM1TPH TIM1MANR
TIME1 TIME12 TIM2TPH TIM2MANR TIME2 TIME22 AP02 AP03
AP04 AP05 AP06 AP07 AP08 AP09 AP10
AP11 AP12 AP13 TPH1 TPH21};

READ ALL INTO Z; * READING IN THE ESIMATED RHO;
USE BLIOUT VAR {BLI};
READ ALL INTO BLI;
USE OPER1 VAR {HRS}; * READING IN THE DEPENDENT VARIABLE;
READ ALL INTO Y;
*****;
*** THIS SECTION PROVIDES THE TRANSFORMATION OF THE DATA ;
*** THAT IS USED IN THE SERIAL CORRELATION CORRECTION ;
*****;

OB1=(1-BLI)**2)**.5; *CONSTRUCTING THE TRANSFORMATION FOR 1ST OB;
K1=NCOL(Z);
NT=NROW(Y); *NT IS THE TOTAL NUMBER OF OBSERVATIONS;
N=NROW(NN); *N IS THE TOTAL NUMBER OF SITES;
TRZ=J(1,K1,{0}); *CONSTRUCTING THE PLACEHOLDER MATRICES;
TRY=J(1,1,{0});
IN1=0;
IN2=0;
DO S=1 TO N BY 1;*IDENTIFYING THE OBSERVATIONS FOR THE jTH SITE;
TL=NN(|S,|);
IN1 = 1 + IN2; * CREATING BOUNDS FOR CURRENT AND LAGGED VECTORS;
IN2 = TL + IN2;
INYD1 = IN1 + 1;
INYD2 = IN2 - 1;
FRST = Z(|IN1,|); * IDENTIFYING THE FIRST OB. FOR SITE J;
OTHER = Z(|INYD1:IN2,|);* IDENTIFYING THE SECOND THROUGH LAST OBS
FOR SITE J;
LAGOB = Z(|IN1:INYD2,|);* IDENTIFYING THE VECTOR OF LAG OBSERVATIONS
FOR SITE J;
FRSTY = Y(|IN1,|);
OTHEY = Y(|INYD1:IN2,|);
LAGY = Y(|IN1:INYD2,|);
FRST1 = FRST * OB1; * TRANSFORMING THE 1ST OBS FOR RHS VARIABLES;
FRSTY1= FRSTY * OB1; * TRANSFORMING THE 1ST OBS FOR LHS VARIABLE ;
OTHER1= OTHER((),1) * (1-BLI); * TRANSFORMING INTERCEPT TERM;
OTHER2= OTHER((),2:K1))- (BLI*LAGOB((),2:K1)); * TRANSFORMING THE
* NON-INTERCEPT RHS;
* VARIABLES;
OTHER3= OTHER1||OTHER2; * CONCATINATING INTER.AND NON-INTERCEPT ;
OTHEY1= OTHEY - (BLI*LAGY); * TRANSFORM THE LHS VARIABLE;
TRZ1=FRST1//OTHER3; * VERTICALLY CONCATINATING THE DATA FOR SITE j;
TRY1=FRSTY1//OTHEY1;
TRZ =TRZ//TRZ1; *VERTICALLY CONCATINATING THE DATA FOR ALL SITES;
TRY =TRY//TRY1;
END;
NTS=NT;
NTS1=NTS+1;
TRZ=TRZ(|2:NTS1,|); *REMOVE PLACEHOLDER OBSERVATION;
TRY=TRY(|2:NTS1,|);
Z=TRZ; *REDEFINE MATRICES FOR ESTIMATION ;
```

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```

FREE TRZ TRY TRZ1 TRY1 FRST1 FRSTY1 OTHER3 OTHEY1 OTHER2 OTHER3;
K1=NCOL(Z);
NTS= NROW(Y); *NTS IS THE TOTAL NUMBER OF OBS AFTER TRANSFORMATION;
X= Z(1,2:K1)); * X MATRIX HAS NO INTERCEPT;
K= NCOL(X);
N1=N+{1};
DFE = NTS - N -K;
XDX= J(K,K,{0}); *INITIALIZING PLACE HOLDER MATRICES FOR REGRESSION;
XDY= J(K,1,{0});
DX= J(1,K,{0});
DY= J(1,1,{0});
I1={0};
I2={0};
* THIS SECTION IDENTIFIES THE DATA FOR EACH SITE j;
DO S={1} TO N BY{ 1};
T = NN(|S,|); * T IS THE # OF OBS FOR SITE j AFTER TRANSFORM;
I1={ 1}+I2; * IDENTIFYING THE 1ST OBS FOR SITE j;
I2=T+I2; * IDENFIFYING THE LAST OBS FOR SITE j;
X1= X(|I1:I2,|);* ISOLATING THE DATA FOR SITE j;
Y1= Y(|I1:I2,|);
JT1 = J(T,1,{1});
IT= I(T);
D = IT - JT1*JT1`/T; * REMOVING THE SITE SPECIFIC EFFECTS;
DX1=D*X1;
DY1=D*Y1;
XDX=XDX+X1`*DX1;
XDY=XDY+X1`*DY1;
DX=DX//DX1; *VERTICALLY CONCATINATING THE DATA;
DY=DY//DY1;
END;
DX= DX(|2:NTS,|); * ELIMINATING THE PLACEHOLDER OBSERVATION;
DY= DY(|2:NTS,|);
B_F= SOLVE(XDX,XDY); * FIXED EFFECTS ETIMATOR: B_F=INV(XDX)*XDY;
RES_F = DY - DX*B_F; * FIXED EFFECTS RESIDUALS ;
SSE_F = RES_F`*RES_F; * FIXED EFFECTS SUM OF SQUARED ERROR;
S2 = SSE_F/DFE; * FIXED EFFECTS REGRESSION VARIANCE;
SER = SQRT(S2); * FIXED EFFECTS STD ERROR OF THE REGRESSION;
VCV = INV(XDX)## S2; * FIXED EFFECTS VAR/COVAR MATRIX;
STD_F= SQRT( VECDIAG(S2* INV(XDX))); * CALCULATING THE STD ERR OF
ESTIMATES;
TTEST_F= B_F/STD_F; * T-STAT OF COEFFICIENTS;
B_FIXED= B_F||TTEST_F;
NK1 = N*K1;
RF={'TPH' 'TPH2' 'MANR' 'MANR2' 'MANRTPH' 'TIME1TPH' 'TIM1MANR'
    'TIME1' 'TIME12' 'TIME2TPH' 'TIM2MANR' 'TIME2' 'TIME22'
    'AP02' 'AP03' 'AP04' 'AP05' 'AP06' 'AP07' 'AP08'
    'AP09' 'AP10' 'AP11' 'AP12' 'AP13'
    'TPH(-1)' 'TPH2(-1)'};
** PRINTING OUT THE RESULTS ***:
PRINT N;
PRINT B_FIXED(| ROWNAME=RF|);
PRINT S2, SER, NTS, N;
PRINT VCV;

```

```
FINISH MAIN;  
RUN MAIN;  
*****  
** END OF PROGRAM **;
```

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NOTE: Unable to open SASUSER.PROFILE. WORK.PROFILE will be opened instead.
NOTE: All profile changes will be lost at the end of the session.

```
1 *****;  
2 *** THIS PROGRAM ESTIMATES THE VARAIBILITIES FOR MAIL PROCESSING LABOR ;  
3 *** THE PROGRAM HAS FIVE PARTS ;  
4 *** ;  
5 *** PART I OF THIS PROGRAM READS IN THE DATA, SELECTS THE OPERATION TO ;  
6 *** BE ESTIMATED AND CREATES THE TIME TREND AND SEASONAL VARIABLES ;  
7 *** ;  
8 *** PART II CREATES THE LAGGED VALUE FOR TPH FOR EACH SITE. BECAUSE OF ;  
9 *** THE PANEL NATURE OF THE DATA THE LAGGING ;  
10 *** MUST BE DONE SEPARATELY FOR EACH SITE ;  
11 *** ;  
12 *** PART III MEAN CENTERS THE DATA & CALCULATES THE INFORMATION REQUIRED ;  
13 *** FOR THE GNR AND HAUSMAN TESTS ;  
14 *** ;  
15 *** PART IV ESTIMATES THE FIXED EFFECTS MODEL WITHOUT A SERIAL ;  
16 *** CORRELATION CORRECTION, CALULATES THE BFN DURBIN WATSON, ;  
17 *** AND THE BLI RHO ;  
18 *** ;  
19 *** PART V ESTIMATES THE FIXED EFFECTS MODEL WITH THE SERIAL CORRELATION ;  
20 *** CORRECTION IN PLACE. ;  
21 *****;  
22  
23 *%%%%%%%%%%%%%%;  
24 * PART I: THIS SECTION OF THE PROGRAM READS IN THE DATA, ;  
25 * SELECTS THE OPERATION TO BE ESTIMATED AND CREATES THE ;  
26 * TIME TREND AND SEASONAL VARIABLES ;  
27 * THE INPUT VARIABLES ARE DEFINED AS FOLLOWS: ;  
28 * THE 'T' PREFIX REFERS TO TPH AND THE 'H' PREFIX REFERS TO HOURS ;  
29 * THE REMAING PORTIONS OF THE VARIABLE NAMES HAVE THE FOLLOWING DEFNS ;  
30 * OCR - OCR OPERATION;  
31 * BCS - BCS OPERATION;  
32 * LSM - LSM OPERATION;  
33 * MANL - MANUAL LETTER OPERATION;  
34 * MANF - MANUAL FLAT OPERATION;  
35 * FSB - FSM OPERATION;  
36 * MANP - MANUAL PARCEL OPERATION;  
37 * MECALLP - MECHANIZED PARCEL OPERATION;  
38 * SPBALLP - SPBS NON-PRIORITY OPERATION;  
39 * MANPRI0 - MANUAL PRIORITY OPERATION;  
40 * SPBPRI0 - SPBS PRIORITY OPERATION;  
41 * IN ADDITION, MANR IS THE MANUAL LETTER RATIO AND MANFR IS THE  
42 * MANUAL FLAT RATIO;  
43 *%%%%%%%%%%%%%%;  
44 *****;
```

```
46 *****Program MANL obtained from Libref 149*****; Attachment 2
47 *****modified to locate data on Libref 148*****; Page 2 of 20
48                                         to OCA/USPS-107-118
49 filename tre 't:\r97-1\libref\h-148\vvmpo.dat';
50
51 *****end modification of datafile location****;
52
53 DATA OPSTAGE; INFILE TRE;
54 INPUT IDNUM FYAP TOCR HOCR TBCS HBCS
55 TLSM HLSM TMANL HMANL TMANF HMANF
56 TFSB HFSB TMANP HMANP TMECALLP HMECALLP TSPBALLP HSPBALLP
57 TMANPRI0 HMANPRI0 TSPBPRI0 HSPBPRI0
58 TCANP HCANP
59 MANR MANFR;
60 ****
61 *** THIS CODE DOUBLE CHECKS THE ELIMINATION OF DATA BEFORE 8801 ***;
62 *** AND AFTER 9613 ***;
63 ****
```

NOTE: The infile TRE is:

```
FILENAME=t:\r97-1\libref\h-148\vvmpo.dat,
RECFM=V,LRECL=256
```

NOTE: 30828 records were read from the infile TRE.

The minimum record length was 59.

The maximum record length was 187.

NOTE: The data set WORK.OPSTAGE has 30828 observations and 28 variables.

NOTE: The DATA statement used 20.1 seconds.

```
64 DATA OPSTAGE; SET OPSTAGE;
65 IF FYAP LT 8801 THEN DELETE;
66 IF FYAP GT 9613 THEN DELETE;
67 ****
68 *** AT THIS POINT THE PROGRAM DEFINES THE OPERATION TO BE ESTIMATED ***;
69 ****
```

NOTE: The data set WORK.OPSTAGE has 30828 observations and 28 variables.

NOTE: The DATA statement used 3.83 seconds.

```
70 DATA OPER; SET OPSTAGE;
71 TPH=TMANL ;
72 HRS=HMANL ;
73 MANR=MANR ;
74 TITLE1 ' MANUAL LETTER OPERATIONS/ HOURS ON TPH';
75 TITLE2 'USING ONLY CONTINUOUS DATA FROM 8801-9613';
76 TITLE3 'INCLUDING OFFICES @ LEAST 39 OBS/LAG MODEL';
77 TITLE4 'USES 12 AP DUMMIES TO CAPTURE SEASONAL EFFECTS';
78 ****
79 *** ELIMINATING UNUSED VARIABLES TO SAVE SPACE ***;
80 ****
```

NOTE: The data set WORK.OPER has 30828 observations and 30 variables.

NOTE: The DATA statement used 4.38 seconds.

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```
81  DATA OPER; SET OPER;  
82  KEEP IDNUM FYAP TPH HRS MANR ;  
83  *****;  
84  *** ELIMINATING DATA WITH MISSING TPH, HRS OR MANR ***;  
85  *****;
```

NOTE: The data set WORK.OPER has 30828 observations and 5 variables.

NOTE: The DATA statement used 1.82 seconds.

```
86  DATA OPER MISSING;  
87  SET OPER;  
88  IF TPH=. OR TPH=0 OR HRS=. OR HRS=0 OR HRS<0 OR MANR=.  
89  THEN OUTPUT MISSING;  
90  ELSE OUTPUT OPER;  
91  *****;  
92  *** THIS WORK FILE NO LONGER NEEDED AND IS ELIMINATED TO SAVE SPACE ***;  
93  *****;
```

NOTE: The data set WORK.OPER has 25090 observations and 5 variables.

NOTE: The data set WORK.MISSING has 5738 observations and 5 variables.

NOTE: The DATA statement used 1.19 seconds.

```
94  PROC DATASETS LIBRARY=WORK;
```

-----Directory-----

| | |
|----------------|-------------------------|
| Libref: | WORK |
| Engine: | V612 |
| Physical Name: | C:\SAS\SASWORK\#TD99915 |

| # | Name | Memtype | Indexes |
|---|---------|---------|---------|
| 1 | MISSING | DATA | |
| 2 | OPER | DATA | |
| 3 | OPSTAGE | DATA | |
| 4 | PROFILE | CATALOG | |

```
95  DELETE OPSTAGE;
```

NOTE: Deleting WORK.OPSTAGE (memtype=DATA).

NOTE: The PROCEDURE DATASETS used 0.66 seconds.

```
96  DATA OPER;SET OPER;  
97  *****;  
98  *** TO CHECK FOR DATA SUFFICIENCY THE PROGRAM IDENTIFIES ***;  
99  *** THE NUMBER OF OBS. PER SITE ***;  
100 *****;
```

NOTE: The data set WORK.OPER has 25090 observations and 5 variables.

NOTE: The DATA statement used 0.88 seconds.

```
101 PROC MEANS NOPRINT;  
102 BY IDNUM;  
103 VAR TPH;  
104 OUTPUT OUT=OUT1 N=N;
```

NOTE: The data set WORK.OUT1 has 309 observations and 4 variables.
NOTE: The PROCEDURE MEANS used 0.93 seconds.

```
105 PROC SORT; BY IDNUM;  
106 ****;  
107 * ELIMINATING ANY SITES THAT DO NOT HAVE 39 OBS ;  
108 ****;
```

NOTE: The data set WORK.OUT1 has 309 observations and 4 variables.
NOTE: The PROCEDURE SORT used 0.22 seconds.

```
109 DATA OPER; MERGE OPER OUT1; BY IDNUM ;
```

NOTE: The data set WORK.OPER has 25090 observations and 8 variables.
NOTE: The DATA statement used 1.42 seconds.

```
110 DATA MODSET; SET OPER;
```

NOTE: The data set WORK.MODSET has 25090 observations and 8 variables.
NOTE: The DATA statement used 1.04 seconds.

```
111 DATA OPER SHORT; SET MODSET;  
112 IF N< 39 THEN OUTPUT SHORT;  
113 IF N > 38 THEN OUTPUT OPER;
```

NOTE: The data set WORK.OPER has 25090 observations and 8 variables.
NOTE: The data set WORK.SHORT has 0 observations and 8 variables.
NOTE: The DATA statement used 1.2 seconds.

```
114 PROC SORT DATA=OPER; BY IDNUM;
```

NOTE: The data set WORK.OPER has 25090 observations and 8 variables.
NOTE: The PROCEDURE SORT used 1.64 seconds.

```
115 PROC DATASETS LIBRARY=WORK;
```

-----Directory-----

| | |
|----------------|-------------------------|
| Libref: | WORK |
| Engine: | V612 |
| Physical Name: | C:\SAS\SASWORK\#TD99915 |

| # | Name | Memtype | Indexes | |
|---|---------|---------|---------|---------------------|
| 1 | MISSING | DATA | | Attachment 2 |
| 2 | MODSET | DATA | | Page 5 of 20 |
| 3 | OPER | DATA | | to OCA/USPS-107-118 |
| 4 | OUT1 | DATA | | |
| 5 | PROFILE | CATALOG | | |
| 6 | SHORT | DATA | | |

116 DELETE MODSET;

NOTE: Deleting WORK.MODSET (memtype=DATA).

NOTE: The PROCEDURE DATASETS used 0.11 seconds.

117 DATA OPER; SET OPER;
 118 IF FYAP GT 9613 THEN DELETE;

NOTE: The data set WORK.OPER has 25090 observations and 8 variables.

NOTE: The DATA statement used 1.1 seconds.

119 DATA OPER; SET OPER;
 120 *****;
 121 *** SETTING UP THE TIME TREND VARIABLES ***;
 122 *****;
 123 IF FYAP LE 8813 THEN TIME1=FYAP-8801+1;
 124 IF FYAP GE 8901 THEN TIME1=FYAP-8901+14;
 125 IF FYAP GE 9001 THEN TIME1=FYAP-9001+27;
 126 IF FYAP GE 9101 THEN TIME1=FYAP-9101+40;
 127 IF FYAP GE 9201 THEN TIME1=FYAP-9201+53;
 128 IF FYAP GE 9301 THEN TIME1=0;
 129 IF FYAP GE 9401 THEN TIME1=0;
 130 IF FYAP GE 9501 THEN TIME1=0;
 131 *****;
 132 IF FYAP LE 8813 THEN TIME2=0;
 133 IF FYAP GE 8901 THEN TIME2=0;
 134 IF FYAP GE 9001 THEN TIME2=0;
 135 IF FYAP GE 9101 THEN TIME2=0;
 136 IF FYAP GE 9201 THEN TIME2=0;
 137 IF FYAP GE 9301 THEN TIME2=FYAP-9301+1;
 138 IF FYAP GE 9401 THEN TIME2=FYAP-9401+14;
 139 IF FYAP GE 9501 THEN TIME2=FYAP-9501+27;
 140 IF FYAP GE 9601 THEN TIME2=FYAP-9601+40;
 141 *****;
 142 *** CREATING THE SEASONAL DUMMY VARIABLES ***;
 143 *****;
 144 IF MOD(FYAP,100)=1 THEN AP01=1; ELSE AP01=0;
 145 IF MOD(FYAP,100)=2 THEN AP02=1; ELSE AP02=0;
 146 IF MOD(FYAP,100)=3 THEN AP03=1; ELSE AP03=0;
 147 IF MOD(FYAP,100)=4 THEN AP04=1; ELSE AP04=0;
 148 IF MOD(FYAP,100)=5 THEN AP05=1; ELSE AP05=0;
 149 IF MOD(FYAP,100)=6 THEN AP06=1; ELSE AP06=0;
 150 IF MOD(FYAP,100)=7 THEN AP07=1; ELSE AP07=0;
 151 IF MOD(FYAP,100)=8 THEN AP08=1; ELSE AP08=0;

```
152 IF MOD(FYAP,100)=9 THEN AP09=1; ELSE AP09=0; Attachment 2
153 IF MOD(FYAP,100)=10 THEN AP10=1; ELSE AP10=0;
154 IF MOD(FYAP,100)=11 THEN AP11=1; ELSE AP11=0;
155 IF MOD(FYAP,100)=12 THEN AP12=1; ELSE AP12=0;
156 IF MOD(FYAP,100)=13 THEN AP13=1; ELSE AP13=0;
157 ****;
158 *** DETERMINING THE NUMBER OF OBS FOR EACH SITE (USED LATER IN THE ***;
159 *** MATRIX MANIPULATIONS). ***;
160 ****;
```

NOTE: The data set WORK.OPER has 25090 observations and 23 variables.
NOTE: The DATA statement used 3.62 seconds.

```
161 PROC SORT; BY IDNUM FYAP;
```

NOTE: The data set WORK.OPER has 25090 observations and 23 variables.
NOTE: The PROCEDURE SORT used 5.2 seconds.

```
162 PROC MEANS NOPRINT;
163 BY IDNUM; VAR TPH;
164 OUTPUT OUT=NOUT N=N;
165
166 *%%%%%%%%%%%%%%%; ;
167 *** PART II: USING PROC IML TO CREATE THE LAGGED DATA ;
168 *** THE LAGGING MUST BE DONE SEPARATELY FOR EACH SITE BECAUSE OF THE ;
169 *** PANEL NATURE OF THE DATA. ONCE THE LAGS ARE MADE FOR EACH SITE ;
170 *** THEY ARE HORIZONTIALLY CONCATINATED WITH THE OTHER VARIABLES ;
171 *** THE DATA FOR ALL SITES ARE THEN VERTICALLY CONCATINATED TO ;
172 *** RECONSTRUCT THE PANEL DATA SET ;
173 *%%%%%%%%%%%%%%%; ;
174 *      **** START OF PROC IML *****;
```

NOTE: The data set WORK.NOUT has 309 observations and 4 variables.
NOTE: The PROCEDURE MEANS used 0.98 seconds.

```
175 PROC IML;
IML Ready
176 RESET AUTONAME ;
177 START MAIN;
178 USE NOUT VAR {N};           * READING IN THE # OF OBS PER SITE;
179 READ ALL INTO NN ;          * N IS NUMBER OF OBS PER SITE;
180 *THE NEXT LINE READS IN DATA FOR THE RHS;
181 USE OPER VAR {IDNUM FYAP TPH MANR TIME1 TIME2 AP02 AP03 AP04
182 AP05 AP06 AP07 AP08 AP09 AP10 AP11 AP12 AP13 } ;
183 READ ALL INTO RZ ;
184 USE OPER VAR {HRS};         * READING IN THE DATA FOR THE DEP VAR;
185 READ ALL INTO RY ;
186 K1= NCOL(RZ);
```

```

186                      * Z AND K1 ARE FOR INTERCEPT FORM; Attachment 2
187  NT= NROW(RY);          * NT IS TOTAL NUMBER OF OBS.; Page 7 of 20
188
189
190
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218
219
          * ESTABLISH PLACEHOLDERS;
          *INITIALIZE POINTERS FOR LAGGING;
          *TL IS NUMBER OF RECORDS FOR A SITE;
          *SECOND OB. THROUGH LAST OB. ;
          *FIRST OB. THROUGH SECOND LAST OB. ;
          *SECOND OB. THROUGH LAST OB. ;
          *HORIZONTAL CONCATINATON OF MATRIX;
          *VERTICAL CONCATINATION OF MATRIX;
          *NUMBER OF OBS DECREASED BY 1 PER SITE;
          *REMOVE PLACEHOLDER OBSERVATION;
          * COMBINE LHS AND RHS VARIABLES;
          * WRITING OUT THE NEW DATA SET;
CREATE LAGSET FROM NEW (|COLNAME=VARN|);
APPEND FROM NEW;
SETOUT LAGSET;
CLOSE LAGSET;
FREE K1 AUGZ AUGY IN1 IN2 CZ1 LZ1 CY1 INYD1
INYD2;
          * ELIMINATING UNUSED VARIABLES TO SAVE SPACE;
FINISH MAIN;

```

NOTE: Module MAIN defined.
220 RUN MAIN;
NOTE: I/O required temporary file to be opened.
NOTE: Reopening data set WORK.OPER.
NOTE: I/O required temporary file to be opened.
NOTE: The data set WORK.LAGSET has 24781 observations and 20 variables.
221 ***** END OF PROC IML PROCEDURE TO CREATE LAG TPH *****;
Exiting IML.
NOTE: 496 workspace compresses.
NOTE: The PROCEDURE IML used 59.86 seconds.

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222 PROC DATASETS LIBRARY=WORK;

-----Directory-----

Libref: WORK
Engine: V612
Physical Name: C:\SAS\SASWORK\#TD99915

| # | Name | Memtype | Indexes |
|---|---------|---------|---------|
| 1 | LAGSET | DATA | |
| 2 | MISSING | DATA | |
| 3 | NOUT | DATA | |
| 4 | OPER | DATA | |
| 5 | OUT1 | DATA | |
| 6 | PROFILE | CATALOG | |
| 7 | SHORT | DATA | |

223 DELETE OPER; *DELETE WORK DATASET TO SAVE SPACE;

224 ;

225 ****%;

226 ** PART III: MEAN CENTERING THE DATA, CALCULATING THE ;

227 ** INFORMATION REQUIRED FOR THE GNR AND THE HAUSMAN TEST ;

228 ****%;

NOTE: Deleting WORK.OPER (memtype=DATA).

NOTE: The PROCEDURE DATASETS used 0.17 seconds.

229 PROC MEANS DATA=LAGSET;

230 VAR TPH TIME1 TIME2 HRS MANR;

231 OUTPUT OUT=MOUT1 MEAN=MTPH MTIME1 MTIME2 MHRS MMANR;

232 *****;

233 * THIS SECTION MEAN CENTERS THE DATA, TAKES LOGS, AND FORMS THE *;

234 * SQUARES AND CROSS PRODUCTS FOR THE REGRESSIONS *;

235 *****;

NOTE: The data set WORK.MOUT1 has 1 observations and 7 variables.

NOTE: The PROCEDURE MEANS used 1.09 seconds.

236 DATA OPER1;
237 IF _N_=1 THEN SET MOUT1; SET LAGSET;
238 TPH=MTPH;

```
239      TPH1=TPH1/MTPH;  
240      HRS=HRS/MHRS;  
241      MANR=MANR/MMANR;  
242      MANR=LOG(MANR);  
243      TPH=LOG(TPH);  
244      TPH1=LOG(TPH1);  
245      HRS=LOG(HRS);  
246      TPH2=TPH*TPH;  
247      TPH21=TPH1*TPH1;  
248      TIME1=TIME1-MTIME1;  
249      TIME12=TIME1*TIME1;  
250      TIM1TPH=TIME1*TPH;  
251      TIME2=TIME2-MTIME2;  
252      TIME22=TIME2*TIME2;  
253      TIM2TPH=TIME2*TPH;  
254      MANR2=MANR*MANR;  
255      MANRTPH=MANR*TPH;  
256      TIM1MANR=TIME1*MANR;  
257      TIM2MANR=TIME2*MANR;
```

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NOTE: The data set WORK.OPER1 has 24781 observations and 37 variables.
NOTE: The DATA statement used 4.23 seconds.

```
258 PROC DATASETS LIBRARY=WORK;
```

-----Directory-----

Libref: WORK
Engine: V612
Physical Name: C:\SAS\SASWORK\#TD99915

| # | Name | Memtype | Indexes |
|---|---------|---------|---------|
| 1 | LAGSET | DATA | |
| 2 | MISSING | DATA | |
| 3 | MOUT1 | DATA | |
| 4 | NOUT | DATA | |
| 5 | OPER1 | DATA | |
| 6 | OUT1 | DATA | |
| 7 | PROFILE | CATALOG | |
| 8 | SHORT | DATA | |

```
259 DELETE LAGSET MISSING MOUT1 OUT1 SHORT TEMP ;
```

NOTE: The file WORK.TEMP (memtype=DATA) was not found, but appears on a DELETE statement.
NOTE: Deleting WORK.LAGSET (memtype=DATA).
NOTE: Deleting WORK.MISSING (memtype=DATA).
NOTE: Deleting WORK.MOUT1 (memtype=DATA).
NOTE: Deleting WORK.OUT1 (memtype=DATA).
NOTE: Deleting WORK.SHORT (memtype=DATA).
NOTE: The PROCEDURE DATASETS used 0.22 seconds.

```
260 DATA OPER1; SET OPER1;
```

NOTE: The data set WORK.OPER1 has 24781 observations and 37 variables.

NOTE: The DATA statement used 4.07 seconds.

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to OCA/USPS-107-118

261 PROC SORT; BY IDNUM FYAP;

NOTE: The data set WORK.OPER1 has 24781 observations and 37 variables.

NOTE: The PROCEDURE SORT used 7.74 seconds.

262 PROC MEANS NOPRINT;

263 BY IDNUM; VAR TPH;

264 OUTPUT OUT=NOUT N=N;

265 ****;*****;

266 *** GENERATING THE OLS RESIDUALS FOR USE IN THE GNR REGRESSIONS ***;

267 *** RUNNING THE GNR REGRESSION AND TESTING FOR THE SIGNIFCANCE ***;

268 *** OF SITE SPECIFIC EFFECTS ***;

269 ****;*****;

NOTE: The data set WORK.NOUT has 309 observations and 4 variables.

NOTE: The PROCEDURE MEANS used 1.32 seconds.

270 PROC REG DATA=OPER1;

271 MODEL HRS = TPH TPH2 MANR MANR2 MANRTPH;

272 OUTPUT OUT=OLSEPS R=ORESID;

WARNING: The variable _NAME_ or _TYPE_ exists in a data set that is not TYPE=CORR, COV, SSCP,
etc.

NOTE: 24781 observations read.

NOTE: 24781 observations used in computations.

NOTE: The data set WORK.OLSEPS has 24781 observations and 38 variables.

NOTE: The PROCEDURE REG used 10.16 seconds.

273 PROC SORT DATA=OLSEPS; BY IDNUM;

NOTE: The data set WORK.OLSEPS has 24781 observations and 38 variables.

NOTE: The PROCEDURE SORT used 8.17 seconds.

274 PROC MEANS NOPRINT DATA=OLSEPS; BY IDNUM;

275 VAR ORESID;

276 OUTPUT OUT=IDEPS MEAN=PORESID;

NOTE: The data set WORK.IDEPS has 309 observations and 4 variables.

NOTE: The PROCEDURE MEANS used 1.2 seconds.

277 DATA RCROSS; MERGE OLSEPS IDEPS; BY IDNUM;

NOTE: The data set WORK.RCROSS has 24781 observations and 39 variables.

NOTE: The DATA statement used 4.33 seconds.

278 PROC SORT DATA=OLSEPS; BY FYAP;
NOTE: The data set WORK.OLSEPS has 24781 observations and 38 variables.
NOTE: The PROCEDURE SORT used 8.13 seconds.

279 PROC MEANS NOPRINT DATA=OLSEPS; BY FYAP;
280 VAR ORESID;
281 OUTPUT OUT=TIMEPS MEAN=TRESID;

NOTE: The data set WORK.TIMEPS has 116 observations and 4 variables.
NOTE: The PROCEDURE MEANS used 1.1 seconds.

282 PROC SORT DATA=RCROSS; BY FYAP;

NOTE: The data set WORK.RCROSS has 24781 observations and 39 variables.
NOTE: The PROCEDURE SORT used 10.16 seconds.

283 DATA RBOTH; MERGE RCROSS TIMEPS; BY FYAP;

NOTE: The data set WORK.RBOTH has 24781 observations and 40 variables.
NOTE: The DATA statement used 4.29 seconds.

284 PROC SORT DATA=RBOTH; BY IDNUM FYAP;

NOTE: The data set WORK.RBOTH has 24781 observations and 40 variables.
NOTE: The PROCEDURE SORT used 8.61 seconds.

285 PROC REG;
286 MODEL HRS = TPH TPH2 MANR MANR2 MANRTPH PORESID TRESID;
287 T1: TEST PORESID;
288 *****;
289 *** ESTIMATING THE BETWEEN OFFICE MODEL FOR HAUSMANN TEST ***;
290 *** NOTE THAT THE AVG.TREND VARIABLES ARE INCLUDED AS EACH ***;
291 *** SITE HAS ITS OWN AVERAGE DEGREE OF TECHNICAL PROGRESS ***;
292 *** THE ESTIMATED COFFICIENTS AND THE VARIANCE/COVARIANCE ***;
293 *** MATRIX ARE SAVED FOR LATER CALCULATION OF HAUSMANN TEST ***;
294 *****;

WARNING: The variable _NAME_ or _TYPE_ exists in a data set that is not TYPE=CORR, COV, SSCP,
etc.

NOTE: 24781 observations read.

NOTE: 24781 observations used in computations.

NOTE: At least one W.D format was too small for the number to be printed. The decimal may be
shifted by the "BEST" format.

NOTE: The PROCEDURE REG used 1.87 seconds.

295 PROC SORT DATA=OPER1; BY IDNUM;

NOTE: Input data set is already sorted, no sorting done.
NOTE: The PROCEDURE SORT used 0.11 seconds.

```
296  PROC MEANS NOPRINT; BY IDNUM;  
297  VAR HRS TPH MANR TIME1 TIME2;  
298  OUTPUT OUT=BTSET MEAN= HRS TPH MANR TIME1 TIME2;
```

NOTE: The data set WORK.BTSET has 309 observations and 8 variables.
NOTE: The PROCEDURE MEANS used 3.35 seconds.

```
299  DATA BTSET; SET BTSET;  
300  KEEP IDNUM HRS TPH MANR TIME1 TIME2;
```

NOTE: The data set WORK.BTSET has 309 observations and 6 variables.
NOTE: The DATA statement used 0.17 seconds.

```
301  DATA BTREG; SET BTSET;  
302  TPH2=TPH**2;  
303  MANR2=MANR**2;  
304  MANRTPH=MANR*TPH;  
305  TIME22=TIME2**2;  
306  TIME12=TIME1**2;  
307  TIM1TPH=TIME1*TPH;  
308  TIM2TPH=TIME2*TPH;  
309  TIM1MANR=TIME1*MANR;  
310  TIM2MANR=TIME2*MANR;
```

NOTE: The data set WORK.BTREG has 309 observations and 15 variables.
NOTE: The DATA statement used 0.27 seconds.

```
311  PROC REG DATA=BTREG OUTEST=BTWCOV COVOUT;  
312  MODEL HRS=TPH TPH2 MANR MANR2 MANRTPH TIM1TPH TIM1MANR  
      TIME1 TIME12 TIM2TPH TIM2MANR TIME2 TIME22;
```

NOTE: 309 observations read.
NOTE: 309 observations used in computations.
NOTE: The data set WORK.BTWCOV has 15 observations and 20 variables.
NOTE: The PROCEDURE REG used 0.28 seconds.

```
314  PROC PRINT DATA=BTWCOV;
```

NOTE: The PROCEDURE PRINT used 0.42 seconds.

```
315  DATA BTWCOV; SET BTWCOV;  
316  KEEP TPH TPH2 MANR MANR2 MANRTPH TIM1TPH TIM1MANR  
      TIME1 TIME12 TIM2TPH TIM2MANR TIME2 TIME22;  
318  ;
```

319 *%%%%%%%%%%%%%; Attachment 2
320 * PART IV USING PROC IML TO ESTIMATE THE FIXED EFFECTS MODEL ; Page 13 of 20
321 * WITHOUT AN AUTOCORRELATION CORRECTION. USING THE RESIDUALS ; to OCA/USPS-107-118
322 * FROM THAT MODEL FOR CALCULATING THE BFN DURBIN WATSON AND THE ;
323 * BLI SERIAL CORRELATION PARAMETER (RHO) ;
324 *%%%%%%%%%%%%%;
325 ***** START OF PROC IML *****;

NOTE: The data set WORK.BTWCOV has 15 observations and 13 variables.

NOTE: The DATA statement used 0.11 seconds.

```
326 PROC IML;  
IML Ready  
327 SHOW SPACE;  
328 RESET AUTONAME ;  
329  
330 START MAIN;  
331 USE NOUT VAR {N};  
331 * READING IN THE # OF OBS PER SITE;  
332 READ ALL INTO NN ;  
332 * N IS NUMBER OF TIME PERIOD PER P.O.;  
333 * READING IN THE DATA FOR RHS VARIABLES;  
334 USE OPER1 VAR  
335 {IDNUM TPH TPH2 MANR MANR2 MANRTPH TIM1TPH TIM1MANR TIME1 TIME12  
336 TIM2TPH TIM2MANR TIME2 TIME22 AP02 AP03 AP04 AP05 AP06 AP07  
337 AP08 AP09 AP10 AP11 AP12 AP13 TPH1 TPH21 };  
338 READ ALL INTO Z ;  
338 * READING IN THE DATA FOR THE DEP VAR;  
339 USE OPER1 VAR {HRS};  
340 READ ALL INTO Y ;  
341 NT= NROW(Y);  
341 *NT IS TOTAL NUMBER OF OBS.;  
342 N=NROW(NN);  
343 NTS=NT;  
343 NTS1=NTS+1;  
344 K1=NCOL(Z);  
345 X= Z(1,2:K1);  
345 * X MATRIX HAS NO INTERCEPT;  
346 K= NCOL(X);  
347 N= NROW(NN);  
347 * N IS TOTAL NUMBER OF SITES;  
348 N1=N+{1};  
349 DFE = NTS - N -K;  
350 XDX= J(K,K,{0});  
351 XDY= J(K,1,{0});  
352 DX= J(1,K,{0});  
352 * INITIALIZING THE PLACE HOLDERS;  
353 DY= J(1,1,{0});  
354 I1={0};  
355 I2={0};  
356 DO S={1} TO N BY{ 1};  
357 T = NN(|S,|);  
357 * NUMBER OF OBS FOR SITE i;
```

```

358     I1={ 1 }+I2;                                * IDENTIFYING THE 1ST OBS FOR SITE i; Attachment 2
358     I2=T+I2;                                * IDENTIFYING THE LAST OBS FOR SITE i; Page 14 of 20
359
359     X1= X(|I1:I2,|);                         * ISOLATING SITE i'S DATA;
360
360     Y1= Y(|I1:I2,|);                         * REMOVING THE SITE SPECIFIC EFFECTS;
361     JT1 = J(T,1,{1});
362     IT= I(T);
363     D = IT - JT1*JT1`/T;
364
364     DX1=D*X1;
365     DY1=D*Y1;
366     XDX=XDX+X1`*DX1;
367     XDY=XDY+X1`*DY1;
368     DX=DX//DX1;
369
369     DX= DX(|2:NTS1,|);                      * VERTICALLY CONCATINATING THE DATA;
370
370     DY=DY//DY1;
371     END;
372     DX= DX(|2:NTS1,|);                      * ELIMINATING THE PLACEHOLDER OBS;
373
373     DY= DY(|2:NTS1,|);                         * FIXED EFFECTS ESTIMATOR;
374     B_F= SOLVE(XDX,XDY);
374
374     RES_F = DY - DX*B_F;                      * FIXED EFFECTS RESIDUALS;
375
375     SSE_F = RES_F`*RES_F;                     * FIXED EFFECTS SUM OF SQUARED ERR;
376
376     S2 = SSE_F/DFE;                          * FIXED EFFECTS REGRESSION VARIANCE;
377
377     SER= SQRT(S2);                           * FIXED EFFECTS STD ERROR OF THE REGRESSION;
378
378     VCV = INV(XDX) # S2;                      * FIXED EFFECTS VAR/COVAR MATRIX;
379
379     YBAR = Y(|+,|)/NTS;                      * CALCULATNG PSUEDO R2;
380
380     YDEV = Y - YBAR;
381     YSQR = YDEV`*YDEV;
382     R2 = {1} - ((SSE_F)/YSQR);
383     STD_F= SQRT(VECDIAG(S2* INV(XDX)));
384
384     TTEST_F= B_F/STD_F;                        * CALCULATES STD ERR OF ESTIM.;

385     TTEST_F= B_F/STD_F;                        * T-STAT OF COEFFICIENTS;
386
386     B_FIXED= B_F||TTEST_F;
387     NK1 = N*K1;
388
388     ****;
389     *** CALCULATING THE BFN DW AND THE BALTAGI-LI RHO ***;
390     *** THESE CALCULATIONS REQUIRE FIRST IDENTIFYING THE RESIDUALS ***;
391     *** BY SITE AND THEN CREATING A SET OF LAGGED RESIDUALS BY SITE ***;
392     *** FINALLY THE CURRENT AND LAGGED RESIDUALS ARE PUT INTO THE ***;
393     *** APPROPRIATE FORMULAS ***;
394
394     R=RES_F;

```

```

396 BIFR=J(1,1,0);                                Attachment 2
396                                     * CREATING PLACEHOLDER MATRICES;    Page 15 of 20
397 BCUR=J(1,1,0);                                to OCA/USPS-107-118
398 BLAG=J(1,1,0);
399 BN1=0;
400 BN2=0;
401 DO S=1 TO N BY 1;
401                                     * IDENTIFYING THE RESIDUALS BY SITE;
402 BL=NN(|S,|)-1;
402                                     * SETTING THE RESIDUAL VECTOR SIZE;
403 BN1=1+BN2;
404 BN2=BL+BN2;
405 BND1=BN1+1;
406 BND2=BN2-1;
407 BR1=R(|BND1:BN2,|);
407                                     * CREATING THE VECTOR OF CURRENT RESIDUALS;
408 LB1=R(|BN1:BND2,|);
408                                     * CREATING THE VECTOR OF LAGGED RESIDUALS;
409 BIFR1=BR1-LB1;
409                                     * CREATING THE VECTOR OF DIFFERENCE RESIDUALS;
410 BCUR1=BR1;
411 BLAG1=LB1;
412 BIFR=BIFR//BIFR1;
412                                     *CONCATINATING THE RESIDUAL VECTORS;
413 BCUR=BCUR//BCUR1;
414 BLAG=BLAG//BLAG1;
415 END;
416 BIFR=BIFR;
417 BCUR=BCUR;
418 BLAG=BLAG;
419 BCURLAG=BCUR`*BLAG;
420 SMSQBF=BIFR`*BIFR;
421 BFN=SMSQBF/SSE_F;
421                                     * CALCULATING THE BFN & BLI STATISTICS;
422 BLI=BCURLAG/(BLAG`*BLAG);
423 **** END OF BFN/BLI CALCULATION           ***;
424 *** CREATE OUTPUT SET FOR BLI STATISTIC   ***;
425 ****
427 VARN2={'BLI'};
428 CREATE BLIOUT FROM BLI (|COLNAME=VARN2|);
429 APPEND FROM BLI;
430 SETOUT BLIOUT;
431 CLOSE BLIOUT;
432 ****
433 *** CALCULATING THE HAUSMAN H STATISTIC   ***;
434 ****
435 USE BTWCOV VAR{TPH TPH2 MANR MANR2 MANRTPH TIM1TPH TIM1MANR
436             TIME1 TIME12 TIM2TPH TIM2MANR TIME2 TIME22};
437 READ ALL INTO BTW;
438 BB = BTW(|1,|);
439 BTCV = BTW(|3:15,|);
440 BF = B_F(|1:13,|);
441 FCV = VCV(|1:13,1:13|);

```

442 H1 = BF`-BB; Attachment 2
443 H2 = INV(FCV + BTCV); Page 16 of 20
444 H3 = BF - BB`;
445 H = H1 * H2 * H3;
446 ***** PRINTING OF OUTPUT *****;
447 RF={ 'TPH' 'TPH2' 'MANR' 'MANR' 'MANRTPH' 'TIME1TP' 'TIME1MAN'
448 'TIME1' 'TIME12' 'TIME2TP' 'TIME2MAN' 'TIME2' 'TIME22'
449 'AP02' 'AP03' 'AP04' 'AP05' 'AP06' 'AP07' 'AP08' 'AP09'
450 'AP10' 'AP11' 'AP12' 'AP13'
451 'TPH(-1)' 'TPH2(-1)';
452 PRINT N;
453 PRINT B_FIXED(| ROWNAME=RF|);
454 PRINT R2, S2, SER, NT, NTS, BFN;
455 PRINT BLI;
456 PRINT H;
457 FINISH MAIN;
NOTE: Module MAIN defined.
458 RUN MAIN;
NOTE: I/O required temporary file to be opened.
NOTE: Reopening data set WORK.OPER1.
NOTE: I/O required temporary file to be opened.
NOTE: The data set WORK.BLIOUT has 1 observations and 1 variables.
Exiting IML.
NOTE: 2234 workspace compresses.
NOTE: The PROCEDURE IML used 1 minute 54.29 seconds.

459 DATA OPER1; SET OPER1;
460 INT=1;

NOTE: The data set WORK.OPER1 has 24781 observations and 38 variables.
NOTE: The DATA statement used 4.88 seconds.

461 DATA COUNT; SET OPER1;

NOTE: The data set WORK.COUNT has 24781 observations and 38 variables.
NOTE: The DATA statement used 3.83 seconds.

462 PROC MEANS NOPRINT;
463 BY IDNUM;
464 VAR TPH;
465 OUTPUT OUT=NOUT N=N;

NOTE: The data set WORK.NOUT has 309 observations and 4 variables.
NOTE: The PROCEDURE MEANS used 1.54 seconds.

466 PROC DATASETS LIBRARY=WORK;
-----Directory-----

Libref: WORK
Engine: V612

| # | Name | Memtype | Indexes |
|----|---------|---------|---------|
| 1 | BLIOUT | DATA | |
| 2 | BTREG | DATA | |
| 3 | BTSET | DATA | |
| 4 | BTWCOV | DATA | |
| 5 | COUNT | DATA | |
| 6 | IDEPS | DATA | |
| 7 | NOUT | DATA | |
| 8 | OLSEPS | DATA | |
| 9 | OPER1 | DATA | |
| 10 | PROFILE | CATALOG | |
| 11 | RBOTH | DATA | |
| 12 | RCROSS | DATA | |
| 13 | TIMEPS | DATA | |

```

467  DELETE COUNT;
468  ;
469  ****%
470  * PART V: ESTIMATING THE FIXED EFFECTS MODEL WITH THE SERIAL      ;
471  * CORRELATION CORRECTION IN PLACE. THE TRANSFORMATION IS DIFFERENT   ;
472  * FOR THE FIRST OBSERVATION FOR EACH SITE THAN THE REMAINING        ;
473  * OBSERVATIONS                                                 ;
474  ****%
475  *****
476  ***      RE-ENTER PROC IML AND USE BLI RHO FOR SERIAL CORRELATION ***;
477  ***      CORRECTION IN PLACE. THE FIRST LINE IS USED TO ENSURE     ***;
478  ***      THERE IS ENOUGH SPACE TO ESTIMATE EQUATIONS                 ***;
479  *****

```

NOTE: Deleting WORK.COUNT (memtype=DATA).

NOTE: The PROCEDURE DATASETS used 0.6 seconds.

```

480  PROC IML SYMSIZE=600000 WORKSIZE=6000000;
NOTE: Assuming that the number is given in bytes and not kilobytes.
NOTE: Assuming that the number is given in bytes and not kilobytes.
Worksize      = 6000000
Symbol size = 600000
IML Ready
481  SHOW SPACE;
482  RESET AUTONAME;
483  START MAIN;
484  USE NOUT VAR {N};          * READING IN THE # OF OBS PER SITE;
485  READ ALL INTO NN;         * N IS THE NUMBER OF TIME PERIODS PER SITE;
486  *READING IN THE DATA FOR THE RHS VARIABLES;
487  USE OPER1 VAR
488  {INT TPH TPH2 MANR MANR2 MANRTPH TIM1TPH TIM1MANR
489    TIME1 TIME12 TIM2TPH TIM2MANR TIME2 TIME22 AP02 AP03
490    AP04 AP05 AP06 AP07 AP08 AP09 AP10
491    AP11 AP12 AP13 TPH1 TPH21};

```

```

492 READ ALL INTO Z;                                * READING IN THE ESTIMATED RHO; Attachment 2
492                                         * READING IN THE ESTIMATED RHO; Page 18 of 20
493 USE BLIOUT VAR {BLI};                           to OCA/USPS-107-118
494 READ ALL INTO BLI;
495 USE OPER1 VAR {HRS};
495                                         * READING IN THE DEPENDENT VARIABLE;
496 READ ALL INTO Y;
497 **** THIS SECTION PROVIDES THE TRANSFORMATION OF THE DATA ;
499 *** THAT IS USED IN THE SERIAL CORRELATION CORRECTION ;
500 **** ;
501 OB1=(1-BLI**2)**.5;
501                                         *CONSTRUCTING THE TRANSFORMATION FOR 1ST OB;
502 K1=NCOL(Z);
503 NT=NROW(Y);
503                                         *NT IS THE TOTAL NUMBER OF OBSERVATIONS;
504 N=NROW(NN);
504                                         *N IS THE TOTAL NUMBER OF SITES;
505 TRZ=J(1,K1,{0});
505                                         *CONSTRUCTING THE PLACEHOLDER MATRICES;
506 TRY=J(1,1,{0});
507 IN1=0;
508 IN2=0;
509 DO S=1 TO N BY 1;
509                                         *IDENTIFYING THE OBSERVATIONS FOR THE jTH SITE;
510 TL=NN(|S|);
511 IN1 = 1 + IN2;
511                                         * CREATING BOUNDS FOR CURRENT AND LAGGED VECTORS;
512 IN2 = TL + IN2;
513 INYD1 = IN1 + 1;
514 INYD2 = IN2 - 1;
515 FRST  = Z(|IN1|);
515                                         * IDENTIFYING THE FIRST OB. FOR SITE J;
516 OTHER = Z(|INYD1:IN2|);
516                                         * IDENTIFYING THE SECOND THROUGH LAST OBS
517                                         FOR SITE J;
518 LAGOBI = Z(|IN1:INYD2|);
518                                         * IDENTIFYING THE VECTOR OF LAG OBSERVATIONS
519                                         FOR SITE J;
520 FRSTY = Y(|IN1|);
521 OTHEY = Y(|INYD1:IN2|);
522 LAGY  = Y(|IN1:INYD2|);
523 FRST1 = FRST  * OB1;
523                                         * TRANSFORMING THE 1ST OBS FOR RHS VARIABLES;
524 FRSTY1= FRSTY * OB1;
524                                         * TRANSFORMING THE 1ST OBS FOR LHS VARIABLE ;
525 OTHER1= OTHER(|,1|) * (1-BLI);
525                                         * TRANSFORMING INTERCEPT TERM;
526 OTHER2= OTHER(|,2:K1|)-(BLI*LAGOB(|,2:K1|));
526                                         * TRANSFORMING THE;
527                                         * NON-INTERCEPT RHS;
528                                         * VARIABLES;
529 OTHER3= OTHER1||OTHER2;
529                                         * CONCATINATING INTER. AND NON-INTERCEPT ;

```

530 OTHEY1= OTHEY - (BLI*LAGY); Attachment 2
 530 * TRANSFORM THE LHS VARIABLE; Page 19 of 20
 531 TRZ1=FRST1//OTHER3; to OCA/USPS-107-118
 531 * VERTICALLY CONCATINATING THE DATA FOR SITE j;
 532 TRY1=FRSTY1//OTHEY1;
 533 TRZ =TRZ//TRZ1;
 533 *VERTICALLY CONCATINATING THE DATA FOR ALL SITES;
 534 TRY =TRY//TRY1;
 535 END;
 536 NTS=NT;
 537 NTS1=NTS+1;
 538 TRZ=TRZ(|2:NTS1,|);
 538 *REMOVE PLACEHOLDER OBSERVATION;
 539 TRY=TRY(|2:NTS1,|);
 540 Z=TRZ;
 540 *REDEFINE MATRICES FOR ESTIMATION ;
 541 Y=TRY;
 542 FREE TRZ TRY TRZ1 TRY1 FRST1 FRSTY1 OTHER3 OTHEY1 OTHER2 OTHER3;
 543 K1=NCOL(Z);
 544 NTS= NROW(Y);
 544 *NTS IS THE TOTAL NUMBER OF OBS AFTER TRANSFORMATION;
 545 X= Z(|,2:K1|);
 545 * X MATRIX HAS NO INTERCEPT;
 546 K= NCOL(X);
 547 N1=N+{1};
 548 DFE = NTS - N -K;
 549 XDX= J(K,K,{0});
 549 *INITIALIZING PLACE HOLDER MATRICES FOR REGRESSION;
 550 XDY= J(K,1,{0});
 551 DX= J(1,K,{0});
 552 DY= J(1,1,{0});
 553 I1={0};
 554 I2={0};
 555 * THIS SECTION IDENTIFIES THE DATA FOR EACH SITE j;
 556 DO S={1} TO N BY{ 1};
 557 T = NN(|S,|);
 557 * T IS THE # OF OBS FOR SITE j AFTER TRANSFORM;
 558 . I1={ 1}+I2;
 558 * IDENTIFYING THE 1ST OBS FOR SITE j;
 559 I2=T+I2;
 559 * IDENFIFYING THE LAST OBS FOR SITE j;
 560 X1= X(|I1:I2,|);
 560 * ISOLATING THE DATA FOR SITE j;
 561 Y1= Y(|I1:I2,|);
 562 JT1 = J(T,1,{1});
 563 IT= I(T);
 564 D = IT - JT1*JT1`/T;
 564 * REMOVING THE SITE SPECIFIC EFFECTS;
 565 DX1=D*X1;
 566 DY1=D*Y1;
 567 XDX=XDX+X1`*DX1;
 568 XDY=XDY+X1`*DY1;
 569 DX=DX//DX1;
 569 *VERTICALLY CONCATINATING THE DATA;

570 DY=DY//DY1; Attachment 2
 571 END;
 572 DX= DX(|2:NTS,|); Page 20 of 20
 573 to OCA/USPS-107-118
 572 * ELIMINATING THE PLACEHOLDER OBSERVATION;
 573 DY= DY(|2:NTS,|);
 574 B_F= SOLVE(XDX,XDY); * FIXED EFFECTS ETIMATOR: B_F=INV(XDX)*XDY;
 574 RES_F = DY - DX*B_F; * FIXED EFFECTS RESIDUALS ;
 575 SSE_F = RES_F`*RES_F; * FIXED EFFECTS SUM OF SQUARED ERROR;
 576 S2 = SSE_F/DFE; * FIXED EFFECTS REGRESSION VARIANCE;
 577 SER = SQRT(S2); * FIXED EFFECTS STD ERROR OF THE REGRESSION;
 578 VCV = INV(XDX)# S2; * FIXED EFFECTS VAR/COVAR MATRIX;
 579 STD_F= SQRT(VECDIAG(S2* INV(XDX))); * CALCULATING THE STD ERR OF
 580 ESTIMATES;
 581
 582 TTEST_F= B_F/STD_F; * T-STAT OF COEFFICIENTS;
 583 B_FIXED= B_F||TTEST_F;
 584 NK1 = N*K1;
 585 RF={'TPH' 'TPH2' 'MANR' 'MANR2' 'MANRTPH' 'TIME1TPH' 'TIM1MANR'
 586 'TIME1' 'TIME12' 'TIME2TPH' 'TIM2MANR' 'TIME2' 'TIME22'
 587 'AP02' 'AP03' 'AP04' 'AP05' 'AP06' 'AP07' 'AP08'
 588 'AP09' 'AP10' 'AP11' 'AP12' 'AP13'
 589 'TPH(-1)' 'TPH2(-1)'};
 590 ** PRINTING OUT THE RESULTS ***:
 591 PRINT N;
 592 PRINT B_FIXED(|| ROWNAME=RF);
 593 PRINT S2, SER, NTS, N;
 594 PRINT VCV;
 595 FINISH MAIN;
 NOTE: Module MAIN defined.
 596
 597 RUN 'MAIN';
 NOTE: I/O required temporary file to be opened.
 NOTE: Reopening data set WORK.OPER1.
 598 *****;
 599 ** END OF PROGRAM **;

MANUAL LETTER OPERATIONS/ HOURS ON TPH Attachment 3
USING ONLY CONTINUOUS DATA FROM 8801-9613 Page 1 of 13
INCLUDING OFFICES @ LEAST 39 OBS/LAG MODEL to OCA/USPS-107-11
USES 12 AP DUMMIES TO CAPTURE SEASONAL EFFECTS

12:30 Wednesday, November 12, 19

| Variable | N | Mean | Std Dev | Minimum | Maximum |
|----------|-------|------------|------------|-------------|------------|
| TPH | 24781 | 9235.21 | 10569.05 | 281.6000000 | 127797.60 |
| TIME1 | 24781 | 16.3037004 | 22.9385838 | 0 | 65.0000000 |
| TIME2 | 24781 | 15.6329446 | 17.2731057 | 0 | 52.0000000 |
| HRS | 24781 | 16123.67 | 20611.04 | 296.0000000 | 191596.00 |
| MANR | 24781 | 0.1813266 | 0.2035047 | 0.0045678 | 1.0000000 |

MANUAL LETTER OPERATIONS/ HOURS ON TPH Attachment 3
 USING ONLY CONTINUOUS DATA FROM 8801-9613 Page 2 of 13
 INCLUDING OFFICES @ LEAST 39 OBS/LAG MODEL to OCA/USPS-107-118
 USES 12 AP DUMMIES TO CAPTURE SEASONAL EFFECTS

12:30 Wednesday, November 12, 19

Model: MODEL1

Dependent Variable: HRS

Analysis of Variance

| Source | DF | Sum of Squares | Mean Square | F Value | Prob>F |
|----------|-------|----------------|-------------|-----------|--------|
| Model | 5 | 26847.24151 | 5369.44830 | 73970.121 | 0.0001 |
| Error | 24775 | 1798.40291 | 0.07259 | | |
| C Total | 24780 | 28645.64442 | | | |
| Root MSE | | 0.26942 | R-square | 0.9372 | |
| Dep Mean | | -0.57960 | Adj R-sq | 0.9372 | |
| C.V. | | -46.48482 | | | |

Parameter Estimates

| Variable | DF | Parameter Estimate | Standard Error | T for H0: Parameter=0 | Prob > T |
|----------|----|--------------------|----------------|--------------------------|-----------|
| INTERCEP | 1 | -0.246693 | 0.00295216 | -83.564 | 0.0001 |
| TPH | 1 | 1.095743 | 0.00226208 | 484.396 | 0.0001 |
| TPH2 | 1 | 0.050359 | 0.00156790 | 32.119 | 0.0001 |
| MANR | 1 | -0.325820 | 0.00366936 | -88.795 | 0.0001 |
| MANR2 | 1 | 0.056762 | 0.00249400 | 22.759 | 0.0001 |
| MANRTPH | 1 | -0.069039 | 0.00294992 | -23.404 | 0.0001 |

MANUAL LETTER OPERATIONS/ HOURS ON TPH
 USING ONLY CONTINUOUS DATA FROM 8801-9613
 INCLUDING OFFICES @ LEAST 39 OBS/LAG MODEL
 USES 12 AP DUMMIES TO CAPTURE SEASONAL EFFECTS

Attachment 3
 Page 3 of 13
 to OCA/USPS-107-1

12:30 Wednesday, November 12, 198

Model: MODEL1

Dependent Variable: HRS

Analysis of Variance

| Source | DF | Sum of Squares | Mean Square | F Value | Prob>F |
|----------|-------|----------------|-------------|------------|--------|
| Model | 7 | 28062.73785 | 4008.96255 | 170377.270 | 0.0001 |
| Error | 24773 | 582.90657 | 0.02353 | | |
| C Total | 24780 | 28645.64442 | | | |
| Root MSE | | 0.15339 | R-square | 0.9797 | |
| Dep Mean | | -0.57960 | Adj R-sq | 0.9796 | |
| C.V. | | -26.46577 | | | |

Parameter Estimates

| Variable | DF | Parameter Estimate | Standard Error | T for H0: Parameter=0 | Prob > T |
|----------|----|--------------------|----------------|-----------------------|-----------|
| INTERCEP | 1 | -0.271507 | 0.00174700 | -155.413 | 0.0001 |
| TPH | 1 | 1.067856 | 0.00134893 | 791.632 | 0.0001 |
| TPH2 | 1 | 0.057029 | 0.00089325 | 63.844 | 0.0001 |
| MANR | 1 | -0.354277 | 0.00222260 | -159.398 | 0.0001 |
| MANR2 | 1 | 0.053728 | 0.00142899 | 37.599 | 0.0001 |
| MANRTPH | 1 | -0.091475 | 0.00175168 | -52.221 | 0.0001 |
| PORESID | 1 | 0.986153 | 0.00453793 | 217.313 | 0.0001 |
| TRESID | 1 | 0.904597 | 0.01923192 | 47.036 | 0.0001 |

MANUAL LETTER OPERATIONS/ HOURS ON TPH
USING ONLY CONTINUOUS DATA FROM 8801-9613
INCLUDING OFFICES @ LEAST 39 OBS/LAG MODEL
USES 12 AP DUMMIES TO CAPTURE SEASONAL EFFECTS

Attachment 3
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to OCA/USPS-107-11

12:30 Wednesday, November 12, 199

Dependent Variable: HRS

Test: T1

Numerator: 1111.2027 DF: 1 F value:47225.106
Denominator: 0.02353 DF:24773 Prob>F: 0.0001

MANUAL LETTER OPERATIONS/ HOURS ON TPH
 USING ONLY CONTINUOUS DATA FROM 8801-9613
 INCLUDING OFFICES @ LEAST 39 OBS/LAG MODEL
 USES 12 AP DUMMIES TO CAPTURE SEASONAL EFFECTS

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to OCA/USPS-107-11

12:30 Wednesday, November 12, 1

Model: MODEL1

Dependent Variable: HRS

Analysis of Variance

| Source | DF | Sum of Squares | Mean Square | F Value | Prob>F |
|----------|-----|----------------|-------------|---------|--------|
| Model | 13 | 306.12652 | 23.54819 | 516.013 | 0.0001 |
| Error | 295 | 13.46228 | 0.04563 | | |
| C Total | 308 | 319.58880 | | | |
| Root MSE | | 0.21362 | R-square | 0.9579 | |
| Dep Mean | | -0.77711 | Adj R-sq | 0.9560 | |
| C.V. | | -27.48949 | | | |

Parameter Estimates

| Variable | DF | Parameter Estimate | Standard Error | T for H0: Parameter=0 | Prob > T |
|----------|----|--------------------|----------------|--------------------------|-----------|
| INTERCEP | 1 | -0.292849 | 0.02623270 | -11.164 | 0.0001 |
| TPH | 1 | 1.056163 | 0.02361002 | 44.734 | 0.0001 |
| TPH2 | 1 | 0.038748 | 0.01577948 | 2.456 | 0.0146 |
| MANR | 1 | -0.387262 | 0.03343349 | -11.583 | 0.0001 |
| MANR2 | 1 | 0.054527 | 0.02515539 | 2.168 | 0.0310 |
| MANRTPH | 1 | -0.114089 | 0.03028482 | -3.767 | 0.0002 |
| TIM1TPH | 1 | 0.002006 | 0.00767996 | 0.261 | 0.7942 |
| TIM1MANR | 1 | 0.003264 | 0.00679560 | 0.480 | 0.6313 |
| TIME1 | 1 | -0.011894 | 0.00748055 | -1.590 | 0.1129 |
| TIME12 | 1 | 0.000150 | 0.00031271 | 0.478 | 0.6327 |
| TIM2TPH | 1 | -0.004356 | 0.00861344 | -0.506 | 0.6135 |
| TIM2MANR | 1 | 0.007312 | 0.00795024 | 0.920 | 0.3585 |
| TIME2 | 1 | -0.019934 | 0.00789077 | -2.526 | 0.0121 |
| TIME22 | 1 | 0.000242 | 0.00039866 | 0.606 | 0.5447 |

MANUAL LETTER OPERATIONS/ HOURS ON TPH
USING ONLY CONTINUOUS DATA FROM 8801-9613
INCLUDING OFFICES @ LEAST 39 OBS/LAG MODEL
USES 12 AP DUMMIES TO CAPTURE SEASONAL EFFECTS

Attachment 3
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to OCA/USPS-107-11

12:30 Wednesday, November 12, 1

| | | | | | I | | | | | M |
|----|--------|-------|----------|-------------|----------|----------|-----------|----------|-----------|----------|
| - | - | - | D | N | | | | | | A |
| M | T | N | E | R | T | | | | | N |
| O | P | M | V | M | R | | | | | R |
| D | Y | A | R | E | E | T | P | A | N | T |
| O | E | P | M | A | S | C | T | H | N | P |
| B | L | E | E | R | E | E | P | H | R | P |
| S | - | - | - | - | P | H | 2 | R | 2 | H |
| 1 | MODEL1 | PARMS | HRS | 0.21362 | -0.29285 | 1.05616 | 0.038748 | -0.38726 | 0.054527 | -0.11409 |
| 2 | MODEL1 | COV | INTERCEP | HRS 0.21362 | 0.00069 | 0.00008 | -0.000106 | 0.00045 | -0.000253 | 0.00027 |
| 3 | MODEL1 | COV | TPH | HRS 0.21362 | 0.00008 | 0.00056 | 0.000220 | 0.00023 | 0.000179 | 0.00027 |
| 4 | MODEL1 | COV | TPH2 | HRS 0.21362 | -0.00011 | 0.00022 | 0.000249 | -0.00004 | 0.000045 | -0.00002 |
| 5 | MODEL1 | COV | MANR | HRS 0.21362 | 0.00045 | 0.00023 | -0.000038 | 0.00112 | 0.000021 | 0.00081 |
| 6 | MODEL1 | COV | MANR2 | HRS 0.21362 | -0.00025 | 0.00018 | 0.000045 | 0.00002 | 0.000633 | 0.00014 |
| 7 | MODEL1 | COV | MANRTPH | HRS 0.21362 | 0.00027 | 0.00027 | -0.000020 | 0.00081 | 0.000137 | 0.00092 |
| 8 | MODEL1 | COV | TIM1TPH | HRS 0.21362 | 0.00002 | 0.00004 | 0.000062 | -0.00001 | 0.000002 | -0.00003 |
| 9 | MODEL1 | COV | TIM1MANR | HRS 0.21362 | 0.00001 | 0.00002 | 0.000005 | 0.00002 | -0.000020 | 0.00006 |
| 10 | MODEL1 | COV | TIME1 | HRS 0.21362 | 0.00001 | 0.00005 | 0.000037 | -0.00001 | -0.000016 | -0.00000 |
| 11 | MODEL1 | COV | TIME12 | HRS 0.21362 | 0.00000 | -0.00000 | -0.000001 | 0.00000 | 0.000000 | 0.00000 |
| 12 | MODEL1 | COV | TIM2TPH | HRS 0.21362 | 0.00004 | 0.00006 | 0.000078 | 0.00001 | 0.000008 | 0.00001 |
| 13 | MODEL1 | COV | TIM2MANR | HRS 0.21362 | -0.00001 | 0.00003 | 0.000008 | 0.00003 | 0.000010 | 0.00009 |
| 14 | MODEL1 | COV | TIME2 | HRS 0.21362 | 0.00003 | 0.00008 | 0.000047 | 0.00001 | -0.000000 | 0.00002 |

| | | | T | | | T | | | | T |
|----|-----------|-----------|-----------|------------|-----------|-----------|-----------|------------|----|---|
| T | I | | | T | I | | | | | I |
| I | M | | | I | M | | | | | M |
| M | 1 | T | | I | M | 2 | T | | | I |
| 1 | M | I | | M | 2 | M | I | | | M |
| O | T | A | M | E | T | A | M | E | H | |
| B | P | N | E | 1 | P | N | E | 2 | R | |
| S | H | R | 1 | 2 | H | R | 2 | 2 | S | |
| 1 | 0.0020056 | 0.0032643 | -0.011894 | 0.00014961 | -.0043557 | 0.0073122 | -0.019934 | 0.00024177 | -1 | |
| 2 | 0.0000182 | 0.0000098 | 0.000013 | 0.00000028 | 0.0000352 | -.0000055 | 0.000028 | -.00000212 | . | |
| 3 | 0.0000368 | 0.0000177 | 0.000049 | -.00000004 | 0.0000622 | 0.0000335 | 0.000082 | 0.00000032 | . | |
| 4 | 0.0000617 | 0.0000050 | 0.000037 | -.00000136 | 0.0000777 | 0.0000082 | 0.000047 | 0.00000158 | . | |
| 5 | -.0000113 | 0.0000155 | -0.000014 | 0.00000076 | 0.0000143 | 0.0000322 | 0.000014 | -.00000082 | . | |
| 6 | 0.0000020 | -.0000203 | -0.000016 | 0.00000001 | 0.0000084 | 0.0000097 | -0.000000 | -.00000027 | . | |
| 7 | -.0000268 | 0.0000607 | -0.000004 | 0.00000096 | 0.0000052 | 0.0000933 | 0.000023 | -.00000056 | . | |
| 8 | 0.0000590 | 0.0000048 | 0.000041 | -.00000128 | 0.0000626 | 0.0000011 | 0.000040 | 0.00000116 | . | |
| 9 | 0.0000048 | 0.0000462 | 0.000013 | -.00000067 | 0.0000057 | 0.0000505 | 0.000015 | 0.00000076 | . | |
| 10 | 0.0000407 | 0.0000131 | 0.000056 | -.00000077 | 0.0000404 | 0.0000123 | 0.000055 | 0.00000093 | . | |
| 11 | -.0000013 | -.0000007 | -0.000001 | 0.00000010 | -.0000013 | -.0000005 | -0.000001 | -.00000011 | . | |
| 12 | 0.0000626 | 0.0000057 | 0.000040 | -.00000131 | 0.0000742 | 0.0000037 | 0.000045 | 0.00000125 | . | |
| 13 | 0.0000011 | 0.0000505 | 0.000012 | -.00000051 | 0.0000037 | 0.0000632 | 0.000016 | 0.00000084 | . | |
| 14 | 0.0000399 | 0.0000146 | 0.000055 | -.00000076 | 0.0000452 | 0.0000165 | 0.000062 | 0.00000091 | . | |

| | | | | | | | | | |
|----|-----------|-----------|-----------|------------|-----------|-----------|-----------|------------|----|
| 1 | 0.0020056 | 0.0032643 | -0.011894 | 0.00014961 | -.0043557 | 0.0073122 | -0.019934 | 0.00024177 | -1 |
| 2 | 0.0000182 | 0.0000098 | 0.000013 | 0.00000028 | 0.0000352 | -.0000055 | 0.000028 | -.00000212 | . |
| 3 | 0.0000368 | 0.0000177 | 0.000049 | -.00000004 | 0.0000622 | 0.0000335 | 0.000082 | 0.00000032 | . |
| 4 | 0.0000617 | 0.0000050 | 0.000037 | -.00000136 | 0.0000777 | 0.0000082 | 0.000047 | 0.00000158 | . |
| 5 | -.0000113 | 0.0000155 | -0.000014 | 0.00000076 | 0.0000143 | 0.0000322 | 0.000014 | -.00000082 | . |
| 6 | 0.0000020 | -.0000203 | -0.000016 | 0.00000001 | 0.0000084 | 0.0000097 | -0.000000 | -.00000027 | . |
| 7 | -.0000268 | 0.0000607 | -0.000004 | 0.00000096 | 0.0000052 | 0.0000933 | 0.000023 | -.00000056 | . |
| 8 | 0.0000590 | 0.0000048 | 0.000041 | -.00000128 | 0.0000626 | 0.0000011 | 0.000040 | 0.00000116 | . |
| 9 | 0.0000048 | 0.0000462 | 0.000013 | -.00000067 | 0.0000057 | 0.0000505 | 0.000015 | 0.00000076 | . |
| 10 | 0.0000407 | 0.0000131 | 0.000056 | -.00000077 | 0.0000404 | 0.0000123 | 0.000055 | 0.00000093 | . |
| 11 | -.0000013 | -.0000007 | -0.000001 | 0.00000010 | -.0000013 | -.0000005 | -0.000001 | -.00000011 | . |
| 12 | 0.0000626 | 0.0000057 | 0.000040 | -.00000131 | 0.0000742 | 0.0000037 | 0.000045 | 0.00000125 | . |
| 13 | 0.0000011 | 0.0000505 | 0.000012 | -.00000051 | 0.0000037 | 0.0000632 | 0.000016 | 0.00000084 | . |
| 14 | 0.0000399 | 0.0000146 | 0.000055 | -.00000076 | 0.0000452 | 0.0000165 | 0.000062 | 0.00000091 | . |

MANUAL LETTER OPERATIONS/ HOURS ON TPH Attachment 3
USING ONLY CONTINUOUS DATA FROM 8801-9613 Page 7 of 13
INCLUDING OFFICES @ LEAST 39 OBS/LAG MODEL to OCA/USPS-107-118
USES 12 AP DUMMIES TO CAPTURE SEASONAL EFFECTS

12:30 Wednesday, November 12, 19

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | I | | | | | | | | |
| | | D | N | | | | | | | | M |
| - | - | E | T | | | | | | | | A |
| M | T | N | P | R | E | | | | | | N |
| O | Y | A | V | M | R | | | | | | R |
| D | E | P | A | S | C | T | P | A | N | T | |
| O | E | M | A | S | C | T | P | H | N | R | P |
| B | L | E | E | R | E | E | P | H | R | 2 | H |
| S | - | - | - | - | P | H | 2 | R | 2 | | |

15 MODEL1 COV TIME22 HRS 0.21362 -0.00000 0.00000 0.000002 -0.00000 -0.000000 -0.000000 -0.00000

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | T | | | T | | | | | | | |
| T | I | | | I | | | | | | | |
| I | M | | | M | | | | | | | T |
| M | 1 | T | | I | M | 2 | | T | I | | |
| 1 | M | I | | M | 2 | M | | I | M | | |
| O | T | A | M | E | T | A | M | E | M | E | H |
| B | P | N | E | 1 | P | N | E | 2 | 2 | 2 | R |
| S | H | R | 1 | 2 | H | R | 2 | 2 | 2 | 2 | S |

15 0.0000012 0.000008 0.000001 -0.0000011 0.0000012 0.0000008 0.000001 0.00000016 .

MANUAL LETTER OPERATIONS/ HOURS ON TPH
USING ONLY CONTINUOUS DATA FROM 8801-9613
INCLUDING OFFICES @ LEAST 39 OBS/LAG MODEL
USES 12 AP DUMMIES TO CAPTURE SEASONAL EFFECTS

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Memory Usage (in bytes):

| | | |
|--------------------------|-------------|------------------|
| Symbol Space | Size 131056 | Available 130032 |
| Extent 1 | Size 131056 | Available 131032 |
| Number of compresses = 0 | | |

N COL1

ROW1 309

B_FIXED COL1 COL2

| | | |
|----------|-----------|-----------|
| TPH | 0.6179662 | 69.950358 |
| TPH2 | -0.007438 | -2.579301 |
| MANR | -0.047159 | -8.302616 |
| MANR | -0.009228 | -3.728913 |
| MANRTPH | 0.0048685 | 1.5772349 |
| TIME1TP | -0.00024 | -4.368536 |
| TIM1MAN | 0.0004119 | 6.0680717 |
| TIME1 | -0.001371 | -10.76732 |
| TIME12 | -6.059E-6 | -1.51596 |
| TIME2TP | -0.000033 | -0.418095 |
| TIM2MAN | 0.000132 | 1.1553539 |
| TIME2 | -0.000501 | -3.196173 |
| TIME22 | 0.0000557 | 10.056562 |
| AP02 | 0.0190548 | 4.0609068 |
| AP03 | 0.0754563 | 16.21069 |
| AP04 | 0.1526823 | 32.437354 |
| AP05 | 0.0548951 | 11.256478 |
| AP06 | 0.0356685 | 7.6140683 |
| AP07 | 0.0207981 | 4.4611547 |
| AP08 | 0.014074 | 3.0218557 |
| AP09 | 0.0103268 | 2.1915121 |
| AP10 | 0.0008901 | 0.1891921 |
| AP11 | -0.01564 | -3.319362 |
| AP12 | -0.002852 | -0.608421 |
| AP13 | -0.006012 | -1.281983 |
| TPH(-1) | -0.029414 | -3.833578 |
| TPH2(-1) | 0.0182223 | 6.8238586 |

R2 COL1

ROW1 0.9836991

S2 COL1

MANUAL LETTER OPERATIONS/ HOURS ON TPH
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USES 12 AP DUMMIES TO CAPTURE SEASONAL EFFECTS to OCA/USPS-107-118

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ROW1 0.019102

SER COL1

ROW1 0.1382101

NT COL1

ROW1 24781

NTS COL1

ROW1 24781

BFN COL1

ROW1 0.5133067

BLI COL1

ROW1 0.7367927

H COL1

ROW1 1012.7726

MANUAL LETTER OPERATIONS/ HOURS ON TPH Attachment 3
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USES 12 AP DUMMIES TO CAPTURE SEASONAL EFFECTS

1
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Memory Usage (in bytes):

| | | |
|--------------------------|--------------|-------------------|
| Symbol Space | Size 600000 | Available 598976 |
| Extent 1 | Size 6000000 | Available 5999976 |
| Number of compresses = 0 | | |

| B_FIXED | COL1 | COL2 |
|---------|------|------|
|---------|------|------|

| | | |
|----------|-----------|-----------|
| TPH | 0.7717603 | 118.50164 |
| TPH2 | -0.012957 | -6.156967 |
| MANR | -0.166282 | -23.43072 |
| MANR2 | -0.007143 | -2.545642 |
| MANRTPH | 0.0137408 | 3.8093761 |
| TIME1TPH | -0.000217 | -2.728409 |
| TIM1MANR | 0.0001672 | 1.7608672 |
| TIME1 | -0.001089 | -4.271162 |
| TIME12 | 8.2993E-6 | 1.0389372 |
| TIME2TPH | -0.000427 | -3.083865 |
| TIM2MANR | 0.0005563 | 2.9696908 |
| TIME2 | 0.0008345 | 3.2593814 |
| TIME22 | -0.000021 | -2.114247 |
| AP02 | 0.002038 | 0.8582083 |
| AP03 | 0.0519453 | 17.078531 |
| AP04 | 0.1229156 | 34.791515 |
| AP05 | 0.0213397 | 5.6149104 |
| AP06 | 0.0227491 | 5.9025251 |
| AP07 | 0.0119892 | 3.0600718 |
| AP08 | 0.0069257 | 1.7644296 |
| AP09 | 0.0101451 | 2.6051391 |
| AP10 | 0.008698 | 2.2968382 |
| AP11 | -0.002946 | -0.821535 |
| AP12 | 0.0074892 | 2.3367164 |
| AP13 | 0.0000792 | 0.0306538 |
| TPH(-1) | 0.0253656 | 5.3803984 |
| TPH2(-1) | 0.007676 | 4.444066 |

| S2 | COL1 |
|----|------|
|----|------|

| | |
|------|-----------|
| ROW1 | 0.0085146 |
|------|-----------|

| SER | COL1 |
|-----|------|
|-----|------|

| | |
|------|-----------|
| ROW1 | 0.0922744 |
|------|-----------|

| NTS | COL1 |
|-----|------|
|-----|------|

MANUAL LETTER OPERATIONS/ HOURS ON TPH
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ROW1 24781

N COL1

ROW1 309

| VCV | COL1 | COL2 | COL3 | COL4 | COL5 | COL6 | COL7 | COL8 | COL9 |
|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| : | COL10 | COL11 | COL12 | COL13 | COL14 | COL15 | COL16 | COL17 | COL18 |
| : | COL19 | COL20 | COL21 | COL22 | COL23 | COL24 | COL25 | COL26 | COL27 |
| ROW1 | 0.0000424 | 9.8677E-6 | -0.000029 | 3.6778E-6 | -0.00001 | 4.0379E-8 | 7.0334E-9 | 1.046E-7 | -2.573E-9 |
| : | 9.2284E-8 | -5.878E-8 | -2.097E-7 | 3.276E-9 | 4.1892E-7 | -6.672E-7 | -2.016E-6 | -5.984E-7 | 1.4166E-6 |
| : | 1.3929E-6 | 1.4285E-6 | 3.1118E-6 | 3.5947E-6 | 3.9373E-6 | 3.1983E-6 | 2.6455E-6 | -2.409E-6 | -5.517E-7 |
| ROW2 | 9.8677E-6 | 4.4287E-6 | -7.038E-6 | 6.2131E-7 | -3.772E-6 | 2.0034E-8 | 1.0308E-9 | 4.1545E-8 | -7.97E-10 |
| : | 1.1421E-8 | -6.141E-9 | -1.252E-8 | -3.01E-10 | 4.2161E-8 | -2.488E-7 | -4.246E-7 | -8.268E-8 | 2.4659E-7 |
| : | 1.9729E-7 | 2.6177E-7 | 5.796E-7 | 5.6061E-7 | 6.0948E-7 | 5.4038E-7 | 4.5623E-7 | -5.748E-7 | 2.235E-7 |
| ROW3 | -0.000029 | -7.038E-6 | 0.0000504 | 1.3289E-6 | 0.0000163 | 1.8138E-8 | 2.8907E-9 | -9.413E-8 | 5.1658E-9 |
| : | 6.9276E-9 | 2.0925E-7 | 5.7643E-7 | -1.014E-8 | -6.486E-7 | -4.076E-7 | -2.218E-6 | 5.0103E-7 | -1.817E-6 |
| : | -1.531E-6 | -1.566E-6 | -2.512E-6 | -2.674E-6 | -2.717E-6 | -2.408E-6 | -2.75E-6 | 1.2638E-6 | 3.5255E-7 |
| ROW4 | 3.6778E-6 | 6.2131E-7 | 1.3289E-6 | 7.8741E-6 | -2.763E-6 | 2.8005E-9 | -4.621E-8 | 2.3484E-8 | -1.239E-9 |
| : | -2.976E-8 | 1.0786E-7 | 6.4377E-8 | -1.143E-9 | -1.071E-7 | -2.366E-7 | -3.588E-7 | -3.905E-7 | -3.762E-8 |
| : | -1.657E-8 | 2.4184E-9 | 1.4426E-7 | 1.4326E-7 | 2.6888E-7 | 2.7893E-7 | 3.1991E-7 | -2.35E-8 | -1.511E-7 |
| ROW5 | -0.00001 | -3.772E-6 | 0.0000163 | -2.763E-6 | 0.000013 | -9.811E-9 | 2.5431E-8 | 5.8967E-9 | 5.12E-10 |
| : | 7.2102E-8 | -1.929E-9 | 1.6718E-7 | -2.148E-9 | -8.739E-8 | 1.1817E-8 | -4.126E-7 | 8.2869E-8 | -6.888E-7 |
| : | -6.043E-7 | -6.989E-7 | -1.178E-6 | -1.321E-6 | -1.405E-6 | -1.169E-6 | -1.075E-6 | 1.5069E-7 | -1.033E-7 |
| ROW6 | 4.0379E-8 | 2.0034E-8 | 1.8138E-8 | 2.8005E-9 | -9.811E-9 | 6.3025E-9 | 2.056E-10 | 2.2552E-9 | 6.16E-11 |
| : | 4.9015E-9 | -4.03E-10 | 1.7036E-9 | 3.943E-11 | 1.6226E-9 | 1.1739E-9 | -1.75E-9 | -4.96E-10 | 2.8022E-9 |
| : | 5.301E-9 | 4.3187E-9 | 7.7498E-9 | 7.5086E-9 | 1.0673E-8 | 8.6947E-9 | 4.026E-9 | 2.7839E-8 | 9.3069E-9 |
| ROW7 | 7.0334E-9 | 1.0308E-9 | 2.8907E-9 | -4.621E-8 | 2.5431E-8 | 2.056E-10 | 9.0145E-9 | 8.508E-10 | 5.789E-11 |
| : | -2.97E-10 | 7.3919E-9 | 9.481E-10 | 6.227E-11 | 1.1885E-9 | -6.5E-10 | 8.178E-10 | -1.61E-9 | -5.44E-10 |
| : | 3.966E-10 | 3.215E-11 | 1.1384E-9 | 3.0848E-9 | 5.1879E-9 | 4.0921E-9 | 4.848E-11 | 1.0283E-8 | 2.2444E-9 |
| ROW8 | 1.046E-7 | 4.1545E-8 | -9.413E-8 | 2.3484E-8 | 5.8967E-9 | 2.2552E-9 | 8.508E-10 | 6.4995E-8 | -1.849E-9 |
| : | 5.4565E-9 | -1.244E-9 | 3.5079E-8 | -8.45E-10 | 3.5658E-8 | 1.1081E-8 | -6.551E-9 | -2.859E-8 | -3.648E-8 |
| : | -4.548E-8 | -4.908E-8 | -4.63E-8 | -4.557E-8 | -3.961E-8 | -2.838E-8 | -1.084E-8 | -5.48E-9 | 2.6269E-8 |
| ROW9 | -2.573E-9 | -7.97E-10 | 5.1658E-9 | -1.239E-9 | 5.12E-10 | 6.16E-11 | 5.789E-11 | -1.849E-9 | 6.381E-11 |
| : | -1.02E-10 | 9.779E-11 | -7.7E-10 | 1.963E-11 | -1.245E-9 | -7.75E-10 | -6.75E-10 | -9.72E-11 | 7.291E-11 |
| : | 2.571E-10 | 1.527E-10 | -2.6E-11 | -1.98E-10 | -4.61E-10 | -1.024E-9 | -1.928E-9 | 1.8925E-9 | -2.06E-10 |

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| | | | | | | | | | | |
|-------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--|
| ROW10 | 9.2284E-8 | 1.1421E-8 | 6.9276E-9 | -2.976E-8 | 7.2102E-8 | 4.9015E-9 | -2.97E-10 | 5.4565E-9 | -1.02E-10 | |
| : | 1.9165E-8 | -4.491E-9 | 6.9502E-9 | 5.248E-11 | 2.577E-10 | 3.2285E-9 | -1.817E-8 | -1.23E-8 | -1.715E-9 | |
| : | -1.35E-11 | 1.1114E-9 | 1.4948E-9 | 1.4631E-8 | 1.7994E-8 | 1.7313E-8 | 1.4753E-8 | 8.7054E-8 | 2.4986E-8 | |
| ROW11 | -5.878E-8 | -6.141E-9 | 2.0925E-7 | 1.0786E-7 | -1.929E-9 | -4.03E-10 | 7.3919E-9 | -1.244E-9 | 9.779E-11 | |
| : | -4.491E-9 | 3.5093E-8 | 9.5978E-9 | 1.81E-10 | 7.8108E-9 | 6.8014E-9 | -6.241E-9 | 9.7375E-9 | 9.5385E-9 | |
| : | 7.7688E-9 | 1.0515E-8 | 6.5779E-9 | 6.0078E-9 | 8.8312E-9 | 6.7003E-9 | -6.353E-9 | 4.4596E-8 | 8.8681E-9 | |
| ROW12 | -2.097E-7 | -1.252E-8 | 5.7643E-7 | 6.4377E-8 | 1.6718E-7 | 1.7036E-9 | 9.481E-10 | 3.5079E-8 | -7.7E-10 | |
| : | 6.9502E-9 | 9.5978E-9 | 6.5554E-8 | -1.672E-9 | 3.202E-8 | 1.769E-8 | -3.842E-8 | -1.66E-8 | -4.643E-8 | |
| : | -5.581E-8 | -6.296E-8 | -7.75E-8 | -8E-8 | -8.155E-8 | -7.641E-8 | -7.868E-8 | 1.0707E-7 | 6.84E-8 | |
| ROW13 | 3.276E-9 | -3.01E-10 | -1.014E-8 | -1.143E-9 | -2.148E-9 | 3.943E-11 | 6.227E-11 | -8.45E-10 | 1.963E-11 | |
| : | 5.248E-11 | 1.81E-10 | -1.672E-9 | 9.49E-11 | -2.4E-10 | 8.121E-10 | 2.3397E-9 | 2.3196E-9 | 2.9693E-9 | |
| : | 3.044E-9 | 3.0041E-9 | 2.8367E-9 | 2.5463E-9 | 2.1125E-9 | 1.3723E-9 | 5.948E-10 | -1.959E-9 | -1.602E-9 | |
| ROW14 | 4.1892E-7 | 4.2161E-8 | -6.486E-7 | -1.071E-7 | -8.739E-8 | 1.6226E-9 | 1.1885E-9 | 3.5658E-8 | -1.245E-9 | |
| : | 2.577E-10 | 7.8108E-9 | 3.202E-8 | -2.4E-10 | 5.6391E-6 | 4.7958E-6 | 4.2644E-6 | 3.9046E-6 | 3.4462E-6 | |
| : | 3.1135E-6 | 2.834E-6 | 2.5827E-6 | 2.254E-6 | 1.8994E-6 | 1.4641E-6 | 9.547E-7 | -1E-6 | -1.986E-7 | |
| ROW15 | -6.672E-7 | -2.488E-7 | -4.076E-7 | -2.366E-7 | 1.1817E-8 | 1.1739E-9 | -6.5E-10 | 1.1081E-8 | -7.75E-10 | |
| : | 3.2285E-9 | 6.8014E-9 | 1.769E-8 | 8.121E-10 | 4.7958E-6 | 9.2511E-6 | 8.0959E-6 | 7.113E-6 | 6.2329E-6 | |
| : | 5.578E-6 | 5.0265E-6 | 4.4766E-6 | 3.8946E-6 | 3.2563E-6 | 2.5132E-6 | 1.6146E-6 | -8.412E-7 | -1.917E-7 | |
| ROW16 | -2.016E-6 | -4.246E-7 | -2.218E-6 | -3.588E-7 | -4.126E-7 | -1.75E-9 | 8.178E-10 | -6.551E-9 | -6.75E-10 | |
| : | -1.817E-8 | -6.241E-9 | -3.842E-8 | 2.3397E-9 | 4.2644E-6 | 8.0959E-6 | 0.0000125 | 0.0000105 | 8.9636E-6 | |
| : | 7.8554E-6 | 6.9726E-6 | 6.0627E-6 | 5.1237E-6 | 4.1892E-6 | 3.2227E-6 | 2.1291E-6 | -1.787E-6 | -4.364E-7 | |
| ROW17 | -5.984E-7 | -8.268E-8 | 5.0103E-7 | -3.905E-7 | 8.2869E-8 | -4.96E-10 | -1.61E-9 | -2.859E-8 | -9.72E-11 | |
| : | -1.23E-8 | 9.7375E-9 | -1.66E-8 | 2.3196E-9 | 3.9046E-6 | 7.113E-6 | 0.0000105 | 0.0000144 | 0.0000118 | |
| : | 0.0000102 | 8.8744E-6 | 7.7414E-6 | 6.4759E-6 | 5.2646E-6 | 3.9405E-6 | 2.4921E-6 | -4.271E-6 | -8.575E-7 | |
| ROW18 | 1.4166E-6 | 2.4659E-7 | -1.817E-6 | -3.762E-8 | -6.888E-7 | 2.8022E-9 | -5.44E-10 | -3.648E-8 | 7.291E-11 | |
| : | -1.715E-9 | 9.5385E-9 | -4.643E-8 | 2.9693E-9 | 3.4462E-6 | 6.2329E-6 | 8.9636E-6 | 0.0000118 | 0.0000149 | |
| : | 0.0000126 | 0.0000108 | 9.2963E-6 | 7.8719E-6 | 6.4682E-6 | 4.8975E-6 | 3.1208E-6 | -1.514E-6 | -3.35E-7 | |
| ROW19 | 1.3929E-6 | 1.9729E-7 | -1.531E-6 | -1.657E-8 | -6.043E-7 | 5.301E-9 | 3.966E-10 | -4.548E-8 | 2.571E-10 | |
| : | -1.35E-11 | 7.7688E-9 | -5.581E-8 | 3.044E-9 | 3.1135E-6 | 5.578E-6 | 7.8554E-6 | 0.0000102 | 0.0000126 | |
| : | 0.0000154 | 0.0000129 | 0.0000109 | 9.0825E-6 | 7.3781E-6 | 5.5389E-6 | 3.4863E-6 | -9.16E-7 | -2.638E-7 | |
| ROW20 | 1.4285E-6 | 2.6177E-7 | -1.566E-6 | 2.4184E-9 | -6.989E-7 | 4.3187E-9 | 3.215E-11 | -4.908E-8 | 1.527E-10 | |
| : | 1.1114E-9 | 1.0515E-8 | -6.296E-8 | 3.0041E-9 | 2.834E-6 | 5.0265E-6 | 6.9726E-6 | 8.8744E-6 | 0.0000108 | |
| : | 0.0000129 | 0.0000154 | 0.0000127 | 0.0000104 | 8.3266E-6 | 6.1715E-6 | 3.8425E-6 | -7.294E-7 | -2.397E-7 | |
| ROW21 | 3.1118E-6 | 5.796E-7 | -2.512E-6 | 1.4426E-7 | -1.178E-6 | 7.7498E-9 | 1.1384E-9 | -4.63E-8 | -2.6E-11 | |
| : | 1.4948E-9 | 6.5779E-9 | -7.75E-8 | 2.8367E-9 | 2.5827E-6 | 4.4766E-6 | 6.0627E-6 | 7.7414E-6 | 9.2963E-6 | |
| : | 0.0000109 | 0.0000127 | 0.0000152 | 0.0000122 | 9.597E-6 | 6.9991E-6 | 4.3165E-6 | -8.056E-7 | -2.204E-7 | |

MANUAL LETTER OPERATIONS/ HOURS ON TPH Attachment 3 1
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ROW22 3.5947E-6 5.6061E-7 -2.674E-6 1.4326E-7 -1.321E-6 7.5086E-9 3.0848E-9 -4.557E-8 -1.98E-10
: 1.4631E-8 6.0078E-9 -8E-8 2.5463E-9 2.254E-6 3.8946E-6 5.1237E-6 6.4759E-6 7.8719E-6
: 9.0825E-6 0.0000104 0.0000122 0.0000143 0.0000111 7.9483E-6 4.8091E-6 2.062E-7 -9.331E-8

ROW23 3.9373E-6 6.0948E-7 -2.717E-6 2.6888E-7 -1.405E-6 1.0673E-8 5.1879E-9 -3.961E-8 -4.61E-10
: 1.7994E-8 8.8312E-9 -8.155E-8 2.1125E-9 1.8994E-6 3.2563E-6 4.1892E-6 5.2646E-6 6.4682E-6
: 7.3781E-6 8.3266E-6 9.597E-6 0.0000111 0.0000129 9.0359E-6 5.3467E-6 6.1846E-7 -1.065E-7

ROW24 3.1983E-6 5.4038E-7 -2.408E-6 2.7893E-7 -1.169E-6 8.6947E-9 4.0921E-9 -2.838E-8 -1.024E-9
: 1.7313E-8 6.7003E-9 -7.641E-8 1.3723E-9 1.4641E-6 2.5132E-6 3.2227E-6 3.9405E-6 4.8975E-6
: 5.5389E-6 6.1715E-6 6.9991E-6 7.9483E-6 9.0359E-6 0.0000103 5.9199E-6 8.9461E-7 -3.736E-8

ROW25 2.6455E-6 4.5623E-7 -2.75E-6 3.1991E-7 -1.075E-6 4.026E-9 4.848E-11 -1.084E-8 -1.928E-9
: 1.4753E-8 -6.353E-9 -7.868E-8 5.948E-10 9.547E-7 1.6146E-6 2.1291E-6 2.4921E-6 3.1208E-6
: 3.4863E-6 3.8425E-6 4.3165E-6 4.8091E-6 5.3467E-6 5.9199E-6 6.6761E-6 3.7071E-7 -3.166E-8

ROW26 -2.409E-6 -5.748E-7 1.2638E-6 -2.35E-8 1.5069E-7 2.7839E-8 1.0283E-8 -5.48E-9 1.8925E-9
: 8.7054E-8 4.4596E-8 1.0707E-7 -1.959E-9 -1E-6 -8.412E-7 -1.787E-6 -4.271E-6 -1.514E-6
: -9.16E-7 -7.294E-7 -8.056E-7 2.062E-7 6.1846E-7 8.9461E-7 3.7071E-7 0.0000222 5.4092E-6

ROW27 -5.517E-7 2.235E-7 3.5255E-7 -1.511E-7 -1.033E-7 9.3069E-9 2.2444E-9 2.6269E-8 -2.06E-10
: 2.4986E-8 8.8681E-9 6.84E-8 -1.602E-9 -1.986E-7 -1.917E-7 -4.364E-7 -8.575E-7 -3.35E-7
: -2.638E-7 -2.397E-7 -2.204E-7 -9.331E-8 -1.065E-7 -3.736E-8 -3.166E-8 5.4092E-6 2.9834E-6

CERTIFICATE OF SERVICE

I hereby certify that I have this date served the foregoing document upon all participants of record in this proceeding in accordance with section 12 of the rules of practice.



KENNETH E. RICHARDSON
Attorney

Washington, D.C. 20268-0001
November 12, 1997

```
FINISH MAIN;  
RUN MAIN;  
*****  
** END OF PROGRAM **;
```

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NOTE: Unable to open SASUSER.PROFILE. WORK.PROFILE will be opened instead.
NOTE: All profile changes will be lost at the end of the session.

```
1 *****;  
2 *** THIS PROGRAM ESTIMATES THE VARIABILITIES FOR MAIL PROCESSING LABOR ;  
3 *** THE PROGRAM HAS FIVE PARTS ;  
4 *** ;  
5 *** PART I OF THIS PROGRAM READS IN THE DATA, SELECTS THE OPERATION TO ;  
6 *** BE ESTIMATED AND CREATES THE TIME TREND AND SEASONAL VARIABLES ;  
7 *** ;  
8 *** PART II CREATES THE LAGGED VALUE FOR TPH FOR EACH SITE. BECAUSE OF ;  
9 *** THE PANEL NATURE OF THE DATA THE LAGGING ;  
10 *** MUST BE DONE SEPARATELY FOR EACH SITE ;  
11 *** ;  
12 *** PART III MEAN CENTERS THE DATA & CALCULATES THE INFORMATION REQUIRED ;  
13 *** FOR THE GNR AND HAUSMAN TESTS ;  
14 *** ;  
15 *** PART IV ESTIMATES THE FIXED EFFECTS MODEL WITHOUT A SERIAL ;  
16 *** CORRELATION CORRECTION, CALCULATES THE BFN DURBIN WATSON, ;  
17 *** AND THE BLI RHO ;  
18 *** ;  
19 *** PART V ESTIMATES THE FIXED EFFECTS MODEL WITH THE SERIAL CORRELATION ;  
20 *** CORRECTION IN PLACE. ;  
21 *****;  
22  
23 *%%%%%%%%%%%%%;  
24 * PART I: THIS SECTION OF THE PROGRAM READS IN THE DATA, ;  
25 * SELECTS THE OPERATION TO BE ESTIMATED AND CREATES THE ;  
26 * TIME TREND AND SEASONAL VARIABLES ;  
27 * THE INPUT VARIABLES ARE DEFINED AS FOLLOWS: ;  
28 * THE 'T' PREFIX REFERS TO TPH AND THE 'H' PREFIX REFERS TO HOURS ;  
29 * THE REMAING PORTIONS OF THE VARIABLE NAMES HAVE THE FOLLOWING DEFNS ;  
30 * OCR - OCR OPERATION;  
31 * BCS - BCS OPERATION;  
32 * LSM - LSM OPERATION;  
33 * MANL - MANUAL LETTER OPERATION;  
34 * MANF - MANUAL FLAT OPERATION;  
35 * FSB - FSM OPERATION;  
36 * MANP - MANUAL PARCEL OPERATION;  
37 * MECALLP - MECHANIZED PARCEL OPERATION;  
38 * SPBALLP - SPBS NON-PRIORITY OPERATION;  
39 * MANPRIOR - MANUAL PRIORITY OPERATION;  
40 * SPBPRIOR - SPBS PRIORITY OPERATION;  
41 * IN ADDITION, MANR IS THE MANUAL LETTER RATIO AND MANFR IS THE  
42 * MANUAL FLAT RATIO;  
43 *%%%%%%%%%%%%%;  
44 *****;
```

```
46 *****Program MANL obtained from Libref 149*****; Attachment 2
47 *****modified to locate data on Libref 148*****; Page 2 of 20
48                                         to OCA/USPS-107-118
49 filename tre 't:\r97-1\libref\h-148\vvmpo.dat';
50
51 *****end modification of datafile location****;
52
53 DATA OPSTAGE; INFILE TRE;
54 INPUT IDNUM FYAP TOCR HOCR TBCS HBCS
55 TLSM HLSM TMANL HMANL TMANF HMANF
56 TFSB HFSB TMANP HMANP TMECALLP HMECALLP TSPBALLP HSPBALLP
57 TMANPRI0 HMANPRI0 TSPBPRI0 HSPBPRI0
58 TCANP HCANP
59 MANR MANFR;
60 ****
61 *** THIS CODE DOUBLE CHECKS THE ELIMINATION OF DATA BEFORE 8801 ***;
62 *** AND AFTER 9613 ***;
63 ****
```

NOTE: The infile TRE is:

```
FILENAME=t:\r97-1\libref\h-148\vvmpo.dat,
RECFM=V,LRECL=256
```

NOTE: 30828 records were read from the infile TRE.

```
The minimum record length was 59.  
The maximum record length was 187.
```

NOTE: The data set WORK.OPSTAGE has 30828 observations and 28 variables.

NOTE: The DATA statement used 20.1 seconds.

```
64 DATA OPSTAGE; SET OPSTAGE;
65 IF FYAP LT 8801 THEN DELETE;
66 IF FYAP GT 9613 THEN DELETE;
67 ****
68 *** AT THIS POINT THE PROGRAM DEFINES THE OPERATION TO BE ESTIMATED ***;
69 ****
```

NOTE: The data set WORK.OPSTAGE has 30828 observations and 28 variables.

NOTE: The DATA statement used 3.83 seconds.

```
70 DATA OPER; SET OPSTAGE;
71 TPH=TMANL ;
72 HRS=HMANL ;
73 MANR=MANR ;
74 TITLE1 ' MANUAL LETTER OPERATIONS/ HOURS ON TPH';
75 TITLE2 'USING ONLY CONTINUOUS DATA FROM 8801-9613';
76 TITLE3 'INCLUDING OFFICES @ LEAST 39 OBS/LAG MODEL';
77 TITLE4 'USES 12 AP DUMMIES TO CAPTURE SEASONAL EFFECTS';
78 ****
79 *** ELIMINATING UNUSED VARIABLES TO SAVE SPACE ***;
80 ****
```

NOTE: The data set WORK.OPER has 30828 observations and 30 variables.

NOTE: The DATA statement used 4.38 seconds.

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```
81  DATA OPER; SET OPER;  
82    KEEP IDNUM FYAP TPH HRS MANR ;  
83  *****;  
84  *** ELIMINATING DATA WITH MISSING TPH, HRS OR MANR      ***;  
85  *****;
```

NOTE: The data set WORK.OPER has 30828 observations and 5 variables.

NOTE: The DATA statement used 1.82 seconds.

```
86  DATA OPER MISSING;  
87  SET OPER;  
88  IF TPH=. OR TPH=0 OR HRS=. OR HRS=0 OR HRS<0 OR MANR=.  
89  THEN OUTPUT MISSING;  
90  ELSE OUTPUT OPER;  
91  *****;  
92  *** THIS WORK FILE NO LONGER NEEDED AND IS ELIMINATED TO SAVE SPACE ***;  
93  *****;
```

NOTE: The data set WORK.OPER has 25090 observations and 5 variables.

NOTE: The data set WORK.MISSING has 5738 observations and 5 variables.

NOTE: The DATA statement used 1.19 seconds.

94 PROC DATASETS LIBRARY=WORK;

-----Directory-----

```
Libref:      WORK  
Engine:      V612  
Physical Name: C:\SAS\SASWORK\#TD99915
```

| # | Name | Memtype | Indexes |
|---|---------|---------|---------|
| 1 | MISSING | DATA | |
| 2 | OPER | DATA | |
| 3 | OPSTAGE | DATA | |
| 4 | PROFILE | CATALOG | |

95 DELETE OPSTAGE;

NOTE: Deleting WORK.OPSTAGE (memtype=DATA).

NOTE: The PROCEDURE DATASETS used 0.66 seconds.

```
96  DATA OPER;SET OPER;  
97  *****;  
98  *** TO CHECK FOR DATA SUFFICIENCY THE PROGRAM IDENTIFIES      ***;  
99  *** THE NUMBER OF OBS. PER SITE      ***;  
100 *****;
```

NOTE: The data set WORK.OPER has 25090 observations and 5 variables.

NOTE: The DATA statement used 0.88 seconds.

```
101 PROC MEANS NOPRINT;  
102 BY IDNUM;  
103 VAR TPH;  
104 OUTPUT OUT=OUT1 N=N;
```

NOTE: The data set WORK.OUT1 has 309 observations and 4 variables.
NOTE: The PROCEDURE MEANS used 0.93 seconds.

```
105 PROC SORT; BY IDNUM;  
106 *****;  
107 * ELIMINATING ANY SITES THAT DO NOT HAVE 39 OBS ;  
108 *****;
```

NOTE: The data set WORK.OUT1 has 309 observations and 4 variables.
NOTE: The PROCEDURE SORT used 0.22 seconds.

```
109 DATA OPER; MERGE OPER OUT1; BY IDNUM ;
```

NOTE: The data set WORK.OPER has 25090 observations and 8 variables.
NOTE: The DATA statement used 1.42 seconds.

```
110 DATA MODSET; SET OPER;
```

NOTE: The data set WORK.MODSET has 25090 observations and 8 variables.
NOTE: The DATA statement used 1.04 seconds.

```
111 DATA OPER SHORT; SET MODSET;  
112 IF N< 39 THEN OUTPUT SHORT;  
113 IF N > 38 THEN OUTPUT OPER;
```

NOTE: The data set WORK.OPER has 25090 observations and 8 variables.
NOTE: The data set WORK.SHORT has 0 observations and 8 variables.
NOTE: The DATA statement used 1.2 seconds.

```
114 PROC SORT DATA=OPER; BY IDNUM;
```

NOTE: The data set WORK.OPER has 25090 observations and 8 variables.
NOTE: The PROCEDURE SORT used 1.64 seconds.

```
115 PROC DATASETS LIBRARY=WORK;
```

-----Directory-----

| | |
|----------------|-------------------------|
| Libref: | WORK |
| Engine: | V612 |
| Physical Name: | C:\SAS\SASWORK\#TD99915 |

| # | Name | Memtype | Indexes | Attachment 2 |
|---|---------|---------|---------|---------------------|
| 1 | MISSING | DATA | | Page 5 of 20 |
| 2 | MODSET | DATA | | to OCA/USPS-107-118 |
| 3 | OPER | DATA | | |
| 4 | OUT1 | DATA | | |
| 5 | PROFILE | CATALOG | | |
| 6 | SHORT | DATA | | |

116 DELETE MODSET;

NOTE: Deleting WORK.MODSET (memtype=DATA).

NOTE: The PROCEDURE DATASETS used 0.11 seconds.

117 DATA OPER; SET OPER;
 118 IF FYAP GT 9613 THEN DELETE;

NOTE: The data set WORK.OPER has 25090 observations and 8 variables.

NOTE: The DATA statement used 1.1 seconds.

119 DATA OPER; SET OPER;
 120 *****;
 121 *** SETTING UP THE TIME TREND VARIABLES ***;
 122 *****;
 123 IF FYAP LE 8813 THEN TIME1=FYAP-8801+1;
 124 IF FYAP GE 8901 THEN TIME1=FYAP-8901+14;
 125 IF FYAP GE 9001 THEN TIME1=FYAP-9001+27;
 126 IF FYAP GE 9101 THEN TIME1=FYAP-9101+40;
 127 IF FYAP GE 9201 THEN TIME1=FYAP-9201+53;
 128 IF FYAP GE 9301 THEN TIME1=0;
 129 IF FYAP GE 9401 THEN TIME1=0;
 130 IF FYAP GE 9501 THEN TIME1=0;
 131 *****;
 132 IF FYAP LE 8813 THEN TIME2=0;
 133 IF FYAP GE 8901 THEN TIME2=0;
 134 IF FYAP GE 9001 THEN TIME2=0;
 135 IF FYAP GE 9101 THEN TIME2=0;
 136 IF FYAP GE 9201 THEN TIME2=0;
 137 IF FYAP GE 9301 THEN TIME2=FYAP-9301+1;
 138 IF FYAP GE 9401 THEN TIME2=FYAP-9401+14;
 139 IF FYAP GE 9501 THEN TIME2=FYAP-9501+27;
 140 IF FYAP GE 9601 THEN TIME2=FYAP-9601+40;
 141 *****;
 142 *** CREATING THE SEASONAL DUMMY VARIABLES ***;
 143 *****;
 144 IF MOD(FYAP,100)=1 THEN AP01=1; ELSE AP01=0;
 145 IF MOD(FYAP,100)=2 THEN AP02=1; ELSE AP02=0;
 146 IF MOD(FYAP,100)=3 THEN AP03=1; ELSE AP03=0;
 147 IF MOD(FYAP,100)=4 THEN AP04=1; ELSE AP04=0;
 148 IF MOD(FYAP,100)=5 THEN AP05=1; ELSE AP05=0;
 149 IF MOD(FYAP,100)=6 THEN AP06=1; ELSE AP06=0;
 150 IF MOD(FYAP,100)=7 THEN AP07=1; ELSE AP07=0;
 151 IF MOD(FYAP,100)=8 THEN AP08=1; ELSE AP08=0;

```
152 IF MOD(FYAP,100)=9 THEN AP09=1; ELSE AP09=0; Attachment 2
153 IF MOD(FYAP,100)=10 THEN AP10=1; ELSE AP10=0;
154 IF MOD(FYAP,100)=11 THEN AP11=1; ELSE AP11=0;
155 IF MOD(FYAP,100)=12 THEN AP12=1; ELSE AP12=0;
156 IF MOD(FYAP,100)=13 THEN AP13=1; ELSE AP13=0;
157 ****;
158 *** DETERMINING THE NUMBER OF OBS FOR EACH SITE (USED LATER IN THE ***;
159 *** MATRIX MANIPULATIONS). ***;
160 ****;
```

NOTE: The data set WORK.OPER has 25090 observations and 23 variables.
NOTE: The DATA statement used 3.62 seconds.

```
161 PROC SORT; BY IDNUM FYAP;
```

NOTE: The data set WORK.OPER has 25090 observations and 23 variables.
NOTE: The PROCEDURE SORT used 5.2 seconds.

```
162 PROC MEANS NOPRINT;
163 BY IDNUM; VAR TPH;
164 OUTPUT OUT=NOUT N=N;
165
166 ****;
167 *** PART II: USING PROC IML TO CREATE THE LAGGED DATA ;
168 *** THE LAGGING MUST BE DONE SEPARATELY FOR EACH SITE BECAUSE OF THE ;
169 *** PANEL NATURE OF THE DATA. ONCE THE LAGS ARE MADE FOR EACH SITE ;
170 *** THEY ARE HORIZONTIALLY CONCATINATED WITH THE OTHER VARIABLES ;
171 *** THE DATA FOR ALL SITES ARE THEN VERTICALLY CONCATINATED TO ;
172 *** RECONSTRUCT THE PANEL DATA SET ;
173 **** START OF PROC IML ****;
```

NOTE: The data set WORK.NOUT has 309 observations and 4 variables.
NOTE: The PROCEDURE MEANS used 0.98 seconds.

```
175 PROC IML;
IML Ready
176 RESET AUTONAME ;
177 START MAIN;
178 USE NOUT VAR {N}; * READING IN THE # OF OBS PER SITE;
179 READ ALL INTO NN ; * N IS NUMBER OF OBS PER SITE;
180 *THE NEXT LINE READS IN DATA FOR THE RHS;
181 USE OPER VAR {IDNUM FYAP TPH MANR TIME1 TIME2 AP02 AP03 AP04
182 AP05 AP06 AP07 AP08 AP09 AP10 AP11 AP12 AP13 } ;
183 READ ALL INTO RZ ;
184 USE OPER VAR {HRS}; * READING IN THE DATA FOR THE DEP VAR;
185 READ ALL INTO RY ;
186 K1= NCOL(RZ);
```

```

186                      * Z AND K1 ARE FOR INTERCEPT FORM; Attachment 2
187      NT= NROW(RY);          * NT IS TOTAL NUMBER OF OBS.; Page 7 of 20
188      N=NROW(NN);           to OCA/USPS-107-118
189      K2=K1+1;
190      AUGZ=J(1,K2,{0});
190                      AUGY=J(1,1,{0}); *ESTABLISH PLACEHOLDERS;
191      IN1=0;
191      IN2=0;               *INITIALIZE POINTERS FOR LAGGING;
192      DO S = 1 TO N BY 1;
193      TL=NN(|S,|);         *TL IS NUMBER OF RECORDS FOR A SITE;
194      IN1=1 + IN2;
194      IN2= TL + IN2;
195      INYD1=IN1+1;
195      INYD2=IN2-1;
196      CZ1=RZ(|INYD1:IN2,|); *SECOND OB. THROUGH LAST OB. ;
197      LZ1=RZ(|IN1:INYD2,3|); *FIRST OB. THROUGH SECOND LAST OB. ;
198      CY1=RY(|INYD1:IN2,|); *SECOND OB. THROUGH LAST OB. ;
199      AUGY1=CY1;
200      AUGZ1=CZ1||LZ1;       *HORIZONTAL CONCATINATON OF MATRIX;
201      AUGZ=AUGZ//AUGZ1;    *VERTICAL CONCATINATION OF MATRIX;
202      AUGY=AUGY//AUGY1;
203      END;
204      NTS=NT-N;
204      NTS1=NTS+1;          *NUMBER OF OBS DECREASED BY 1 PER SITE;
205      AUGZ=AUGZ(|2:NTS1,|); *REMOVE PLACEHOLDER OBSERVATION;
206      AUGY=AUGY(|2:NTS1,|);
207      Z =AUGZ;
207      Y=AUGY;
208      NEW=AUGY||AUGZ;       * COMBINE LHS AND RHS VARIABLES;
209      VARN={'HRS' 'IDNUM' 'FYAP' 'TPH' 'MANR'
210      'TIME1' 'TIME2' 'AP02' 'AP03' 'AP04' 'AP05' 'AP06'
211      'AP07' 'AP08' 'AP09' 'AP10' 'AP11' 'AP12' 'AP13'
212      'TPH1' };
212                      *WRITING OUT THE NEW DATA SET;
213      CREATE LAGSET FROM NEW (|COLNAME=VARN|);
214      APPEND FROM NEW;
215      SETOUT LAGSET;
216      CLOSE LAGSET;
217      FREE K1 AUGZ AUGY IN1 IN2 CZ1 LZ1 CY1 INYD1
218      INYD2;                * ELIMINATING UNUSED VARIABLES TO SAVE SPACE;
219      FINISH MAIN;

```

NOTE: Module MAIN defined.

220 RUN MAIN;

NOTE: I/O required temporary file to be opened.

NOTE: Reopening data set WORK.OPER.

NOTE: I/O required temporary file to be opened.

NOTE: The data set WORK.LAGSET has 24781 observations and 20 variables.

221 ***** END OF PROC IML PROCEDURE TO CREATE LAG TPH *****;

Exiting IML.

NOTE: 496 workspace compresses.

NOTE: The PROCEDURE IML used 59.86 seconds.

222 PROC DATASETS LIBRARY=WORK;

-----Directory-----

| | |
|----------------|-------------------------|
| Libref: | WORK |
| Engine: | V612 |
| Physical Name: | C:\SAS\SASWORK\#TD99915 |

| # | Name | Memtype | Indexes |
|---|---------|---------|---------|
| 1 | LAGSET | DATA | |
| 2 | MISSING | DATA | |
| 3 | NOUT | DATA | |
| 4 | OPER | DATA | |
| 5 | OUT1 | DATA | |
| 6 | PROFILE | CATALOG | |
| 7 | SHORT | DATA | |

223 DELETE OPER; *DELETE WORK DATASET TO SAVE SPACE;

224 ;

225 *%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*;

226 ** PART III: MEAN CENTERING THE DATA, CALCULATING THE ;

227 ** INFORMATION REQUIRED FOR THE GNR AND THE HAUSMAN TEST ;

228 *%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*%*;

NOTE: Deleting WORK.OPER (memtype=DATA).

NOTE: The PROCEDURE DATASETS used 0.17 seconds.

229 PROC MEANS DATA=LAGSET;

230 VAR TPH TIME1 TIME2 HRS MANR;

231 OUTPUT OUT=MOUT1 MEAN=MTPH MTIME1 MTIME2 MHRS MMANR;

232 *****;

233 * THIS SECTION MEAN CENTERS THE DATA, TAKES LOGS, AND FORMS THE *;

234 * SQUARES AND CROSS PRODUCTS FOR THE REGRESSIONS *;

235 *****;

NOTE: The data set WORK.MOUT1 has 1 observations and 7 variables.

NOTE: The PROCEDURE MEANS used 1.09 seconds.

236 DATA OPER1;

237 IF _N_=1 THEN SET MOUT1; SET LAGSET;

238 TPH=TPH/MTPH;

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```
239      TPH1=TPH1/MTPH;                                Attachment 2
240      HRS=HRS/MHRS;                                 Page 9 of 20
241      MANR=MANR/MMANR;                               to OCA/USPS-107-118
242      MANR=LOG(MANR);
243      TPH=LOG(TPH);
244      TPH1=LOG(TPH1);
245      HRS=LOG(HRS);
246      TPH2=TPH*TPH;
247      TPH21=TPH1*TPH1;
248      TIME1=TIME1-MTIME1;
249      TIME12=TIME1*TIME1;
250      TIM1TPH=TIME1*TPH;
251      TIME2=TIME2-MTIME2;
252      TIME22=TIME2*TIME2;
253      TIM2TPH=TIME2*TPH;
254      MANR2=MANR*MANR;
255      MANRTPH=MANR*TPH;
256      TIM1MANR=TIME1*MANR;
257      TIM2MANR=TIME2*MANR;
```

NOTE: The data set WORK.OPER1 has 24781 observations and 37 variables.

NOTE: The DATA statement used 4.23 seconds.

```
258 PROC DATASETS LIBRARY=WORK;
```

-----Directory-----

```
Libref:        WORK
Engine:        V612
Physical Name: C:\SAS\SASWORK\#TD99915
```

| # | Name | Memtype | Indexes |
|---|---------|---------|---------|
| 1 | LAGSET | DATA | |
| 2 | MISSING | DATA | |
| 3 | MOUT1 | DATA | |
| 4 | NOUT | DATA | |
| 5 | OPER1 | DATA | |
| 6 | OUT1 | DATA | |
| 7 | PROFILE | CATALOG | |
| 8 | SHORT | DATA | |

```
259 DELETE LAGSET MISSING MOUT1 OUT1 SHORT TEMP ;
```

NOTE: The file WORK.TEMP (memtype=DATA) was not found, but appears on a DELETE statement.

NOTE: Deleting WORK.LAGSET (memtype=DATA).

NOTE: Deleting WORK.MISSING (memtype=DATA).

NOTE: Deleting WORK.MOUT1 (memtype=DATA).

NOTE: Deleting WORK.OUT1 (memtype=DATA).

NOTE: Deleting WORK.SHORT (memtype=DATA).

NOTE: The PROCEDURE DATASETS used 0.22 seconds.

```
260 DATA OPER1; SET OPER1;
```

NOTE: The data set WORK.OPER1 has 24781 observations and 37 variables.

NOTE: The DATA statement used 4.07 seconds.

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261 PROC SORT; BY IDNUM FYAP;

NOTE: The data set WORK.OPER1 has 24781 observations and 37 variables.

NOTE: The PROCEDURE SORT used 7.74 seconds.

262 PROC MEANS NOPRINT;

263 BY IDNUM; VAR TPH;

264 OUTPUT OUT=NOUT N=N;

265 ****;*****;

266 *** GENERATING THE OLS RESIDUALS FOR USE IN THE GNR REGRESSIONS ***;

267 *** RUNNING THE GNR REGRESSION AND TESTING FOR THE SIGNIFCANCE ***;

268 *** OF SITE SPECIFIC EFFECTS ***;

269 ****;*****;

NOTE: The data set WORK.NOUT has 309 observations and 4 variables.

NOTE: The PROCEDURE MEANS used 1.32 seconds.

270 PROC REG DATA=OPER1;

271 MODEL HRS = TPH TPH2 MANR MANR2 MANRTPH;

272 OUTPUT OUT=OLSEPS R=ORESID;

WARNING: The variable _NAME_ or _TYPE_ exists in a data set that is not TYPE=CORR, COV, SSCP,
etc.

NOTE: 24781 observations read.

NOTE: 24781 observations used in computations.

NOTE: The data set WORK.OLSEPS has 24781 observations and 38 variables.

NOTE: The PROCEDURE REG used 10.16 seconds.

273 PROC SORT DATA=OLSEPS; BY IDNUM;

NOTE: The data set WORK.OLSEPS has 24781 observations and 38 variables.

NOTE: The PROCEDURE SORT used 8.17 seconds.

274 PROC MEANS NOPRINT DATA=OLSEPS; BY IDNUM;

275 VAR ORESID;

276 OUTPUT OUT=IDEPS MEAN=PORESID;

NOTE: The data set WORK.IDEPS has 309 observations and 4 variables.

NOTE: The PROCEDURE MEANS used 1.2 seconds.

277 DATA RCROSS; MERGE OLSEPS IDEPS; BY IDNUM;

NOTE: The data set WORK.RCROSS has 24781 observations and 39 variables.

NOTE: The DATA statement used 4.33 seconds.

NOTE: The data set WORK.OLSEPS has 24781 observations and 38 variables.
NOTE: The PROCEDURE SORT used 8.13 seconds.

278 PROC SORT DATA=OLSEPS; BY FYAP;
279 PROC MEANS NOPRINT DATA=OLSEPS; BY FYAP;
280 VAR ORESID;
281 OUTPUT OUT=TIMEPS MEAN=TRESID;

NOTE: The data set WORK.TIMEPS has 116 observations and 4 variables.
NOTE: The PROCEDURE MEANS used 1.1 seconds.

282 PROC SORT DATA=RCROSS; BY FYAP;

NOTE: The data set WORK.RCROSS has 24781 observations and 39 variables.
NOTE: The PROCEDURE SORT used 10.16 seconds.

283 DATA RBOTH; MERGE RCROSS TIMEPS; BY FYAP;

NOTE: The data set WORK.RBOTH has 24781 observations and 40 variables.
NOTE: The DATA statement used 4.29 seconds.

284 PROC SORT DATA=RBOTH; BY IDNUM FYAP;

NOTE: The data set WORK.RBOTH has 24781 observations and 40 variables.
NOTE: The PROCEDURE SORT used 8.61 seconds.

285 PROC REG;
286 MODEL HRS = TPH TPH2 MANR MANR2 MANRTPH PORESID TRESID;
287 T1: TEST PORESID;
288 *****;
289 *** ESTIMATING THE BETWEEN OFFICE MODEL FOR HAUSMANN TEST ***;
290 *** NOTE THAT THE AVG.TREND VARIABLES ARE INCLUDED AS EACH ***;
291 *** SITE HAS ITS OWN AVERAGE DEGREE OF TECHNICAL PROGRESS ***;
292 *** THE ESTIMATED COFFICIENTS AND THE VARIANCE/COVARIANCE ***;
293 *** MATRIX ARE SAVED FOR LATER CALCULATION OF HAUSMANN TEST ***;
294 *****;

WARNING: The variable _NAME_ or _TYPE_ exists in a data set that is not TYPE=CORR, COV, SSCP,
etc.

NOTE: 24781 observations read.

NOTE: 24781 observations used in computations.

NOTE: At least one W.D format was too small for the number to be printed. The decimal may be
shifted by the "BEST" format.

NOTE: The PROCEDURE REG used 1.87 seconds.

295 PROC SORT DATA=OPER1; BY IDNUM;

NOTE: Input data set is already sorted, no sorting done.
NOTE: The PROCEDURE SORT used 0.11 seconds.

```
296  PROC MEANS NOPRINT; BY IDNUM;  
297  VAR HRS TPH MANR TIME1 TIME2;  
298  OUTPUT OUT=BTSET MEAN= HRS TPH MANR TIME1 TIME2;
```

NOTE: The data set WORK.BTSET has 309 observations and 8 variables.
NOTE: The PROCEDURE MEANS used 3.35 seconds.

```
299  DATA BTSET; SET BTSET;  
300  KEEP IDNUM HRS TPH MANR TIME1 TIME2;
```

NOTE: The data set WORK.BTSET has 309 observations and 6 variables.
NOTE: The DATA statement used 0.17 seconds.

```
301  DATA BTREG; SET BTSET;  
302  TPH2=TPH**2;  
303  MANR2=MANR**2;  
304  MANRTPH=MANR*TPH;  
305  TIME22=TIME2**2;  
306  TIME12=TIME1**2;  
307  TIM1TPH=TIME1*TPH;  
308  TIM2TPH=TIME2*TPH;  
309  TIM1MANR=TIME1*MANR;  
310  TIM2MANR=TIME2*MANR;
```

NOTE: The data set WORK.BTREG has 309 observations and 15 variables.
NOTE: The DATA statement used 0.27 seconds.

```
311  PROC REG DATA=BTREG OUTEST=BTWCOV COVOUT;  
312  MODEL HRS=TPH TPH2 MANR MANR2 MANRTPH TIM1TPH TIM1MANR  
      TIME1 TIME12 TIM2TPH TIM2MANR TIME2 TIME22;
```

NOTE: 309 observations read.
NOTE: 309 observations used in computations.
NOTE: The data set WORK.BTWCOV has 15 observations and 20 variables.
NOTE: The PROCEDURE REG used 0.28 seconds.

```
314  PROC PRINT DATA=BTWCOV;
```

NOTE: The PROCEDURE PRINT used 0.42 seconds.

```
315  DATA BTWCOV; SET BTWCOV;  
316  KEEP TPH TPH2 MANR MANR2 MANRTPH TIM1TPH TIM1MANR  
      TIME1 TIME12 TIM2TPH TIM2MANR TIME2 TIME22;  
318  ;
```

```
319 *%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%; Attachment 2
320 * PART IV USING PROC IML TO ESTIMATE THE FIXED EFFECTS MODEL ; Page 13 of 20
321 * WITHOUT AN AUTOCORRELATION CORRECTION. USING THE RESIDUALS ; to OCA/USPS-107-118
322 * FROM THAT MODEL FOR CALCULATING THE BFN DURBIN WATSON AND THE ;
323 * BLI SERIAL CORRELATION PARAMETER (RHO) ;
324 *%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%; ;
325 ***** START OF PROC IML *****;
```

NOTE: The data set WORK.BTWC0V has 15 observations and 13 variables.

NOTE: The DATA statement used 0.11 seconds.

```
326 PROC IML;
IML Ready
327 SHOW SPACE;
328 RESET AUTONAME ;
329
330 START MAIN;
331 USE NOUT VAR {N};                                * READING IN THE # OF OBS PER SITE;
332 READ ALL INTO NN ;                               * N IS NUMBER OF TIME PERIOD PER P.O. ;
333 * READING IN THE DATA FOR RHS VARIABLES;
334 USE OPER1 VAR
335 {IDNUM TPH TPH2 MANR MANR2 MANRTPH TIM1TPH TIM1MANR TIME1 TIME12
336 TIM2TPH TIM2MANR TIME2 TIME22 AP02 AP03 AP04 AP05 AP06 AP07
337 AP08 AP09 AP10 AP11 AP12 AP13 TPH1 TPH21 };
338 READ ALL INTO Z ;                                * READING IN THE DATA FOR THE DEP VAR;
339 USE OPER1 VAR {HRS};
340 READ ALL INTO Y ;
341 NT= NROW(Y);                                     *NT IS TOTAL NUMBER OF OBS. ;
342 N=NROW(NN);
343 NTS=NT;
344 NTS1=NTS+1;
345 K1=NCOL(Z);                                     * X MATRIX HAS NO INTERCEPT;
346 X= Z(1,2:K1);
347 K= NCOL(X);
348 N= NROW(NN);                                     * N IS TOTAL NUMBER OF SITES;
349 N1=N+{1};
350 DFE = NTS - N -K;
351 XDX= J(K,K,{0});
352 XDY= J(K,1,{0});
353 DX= J(1,K,{0});                                 * INITIALIZING THE PLACE HOLDERS;
354 DY= J(1,1,{0});
355 I1={0};
356 I2={0};
357 DO S={1} TO N BY{ 1};                           T = NN(|S,|); * NUMBER OF OBS FOR SITE i;
358
```

```

358     I1={ 1}+I2;                                * IDENTIFYING THE 1ST OBS FOR SITE i;
359     I2=T+I2;                                * IDENTIFYING THE LAST OBS FOR SITE i;
360     X1= X( |I1:I2, |);                      * ISOLATING SITE i'S DATA;
361     Y1= Y( |I1:I2, |);
362     JT1 = J(T,1,{1});
363     IT= I(T);
364     D = IT - JT1*JT1`/T;
365                                         * REMOVING THE SITE SPECIFIC EFFECTS;
366     DX1=D*X1;
367     DY1=D*Y1;
368     XDX=XDX+X1`*DX1;
369     XDY=XDY+X1`*DY1;
370     DX=DX//DX1;
371                                         * VERTICALLY CONCATINATING THE DATA;
372     END;
373     DX= DX( |2:NTS1, |);
374                                         * ELIMINATING THE PLACEHOLDER OBS;
375     DY= DY( |2:NTS1, |);
376     B_F= SOLVE(XDX,XDY);
377                                         * FIXED EFFECTS ESTIMATOR;
378                                         B_F=INV(XDX)*XDY ;
379     RES_F = DY - DX*B_F;
380                                         * FIXED EFFECTS RESIDUALS;
381     SSE_F = RES_F`*RES_F;
382                                         * FIXED EFFECTS SUM OF SQUARED ERR;
383     S2 = SSE_F/DFE;
384                                         * FIXED EFFECTS REGRESSION VARIANCE;
385     SER= SQRT(S2);
386                                         * FIXED EFFECTS STD ERROR OF THE REGRESSION;
387     VCV = INV(XDX) # S2;
388                                         * FIXED EFFECTS VAR/COVAR MATRIX;
389     YBAR = Y( |+, |)/NTS;
390                                         * CALCULATNG PSUEDO R2;
391     YDEV = Y - YBAR;
392     YSQR = YDEV`*YDEV;
393     R2 = {1} - ((SSE_F)/YSQR);
394     STD_F= SQRT(VECDIAG(S2* INV(XDX)));
395                                         * CALCULATES STD ERR OF ESTIM.;

396     TTEST_F= B_F/STD_F;
397                                         * T-STAT OF COEFFICIENTS;
398     B_FIXED= B_F||TTEST_F;
399     NK1 = N*K1;
400     ****;
401     *** CALCULATING THE BFN DW AND THE BALTAGI-LI RHO      ***;
402     *** THESE CALCULATIONS REQUIRE FIRST IDENTIFYING THE RESIDUALS ***;
403     *** BY SITE AND THEN CREATING A SET OF LAGGED RESIDUALS BY SITE ***;
404     *** FINALLY THE CURRENT AND LAGGED RESIDUALS ARE PUT INTO THE ***;
405     *** APPROPRIATE FORMULAS      ***;
406     ****;
407     R=RES_F;

```

```

396 BIFR=J(1,1,0);                                Attachment 2
396 * CREATING PLACEHOLDER MATRICES;          Page 15 of 20
397 BCUR=J(1,1,0);
398 BLAG=J(1,1,0);
399 BN1=0;
400 BN2=0;
401 DO S=1 TO N BY 1;
401 * IDENTIFYING THE RESIDUALS BY SITE;
402 BL=NN(|S,|)-1;
402 * SETTING THE RESIDUAL VECTOR SIZE;
403 BN1=1+BN2;
404 BN2=BL+BN2;
405 BND1=BN1+1;
406 BND2=BN2-1;
407 BR1=R(|BND1:BN2,|);
407 * CREATING THE VECTOR OF CURRENT RESIDUALS;
408 LB1=R(|BN1:BND2,|);
408 * CREATING THE VECTOR OF LAGGED RESIDUALS;
409 BIFR1=BR1-LB1;
409 * CREATING THE VECTOR OF DIFFERENCE RESIDUALS;
410 BCUR1=BR1;
411 BLAG1=LB1;
412 BIFR=BIFR//BIFR1;
412 *CONCATINATING THE RESIDUAL VECTORS;
413 BCUR=BCUR//BCUR1;
414 BLAG=BLAG//BLAG1;
415 END;
416 BIFR=BIFR;
417 BCUR=BCUR;
418 BLAG=BLAG;
419 BCURLAG=BCUR`*BLAG;
420 SMSQBF=BIFR`*BIFR;
421 BFN=SMSQBF/SSE_F;
421 * CALCULATING THE BFN & BLI STATISTICS;
422 BLI=BCURLAG/(BLAG`*BLAG);
423 ****;
424 *** END OF BFN/BLI CALCULATION           ***;
425 *** CREATE OUTPUT SET FOR BLI STATISTIC   ***;
426 ****;
427 VARN2={'BLI'};
428 CREATE BLIOUT FROM BLI (|COLNAME=VARN2|);
429 APPEND FROM BLI;
430 SETOUT BLIOUT;
431 CLOSE BLIOUT;
432 ****;
433 *** CALCULATING THE HAUSMAN H STATISTIC    ***;
434 ****;
435 USE BTWCOV VAR{TPH TPH2 MANR MANR2 MANRTPH TIM1TPH TIM1MANR
435 TIME1 TIME12 TIM2TPH TIM2MANR TIME2 TIME22};
436 READ ALL INTO BTW;
438 BB = BTW(|1,|);
439 BTCV = BTW(|3:15,|);
440 BF = B_F(|1:13,|);
441 FCV = VCV(|1:13,1:13|);

```

442 H1 = BF`-BB;
443 H2 = INV(FCV + BTCV);
444 H3 = BF - BB`;
445 H = H1 * H2 * H3;
446 ***** PRINTING OF OUTPUT *****;
447 RF={ 'TPH' 'TPH2' 'MANR' 'MANR' 'MANRTPH' 'TIME1TP' 'TIM1MAN'
'TIME1' 'TIME12' 'TIME2TP' 'TIM2MAN' 'TIME2' 'TIME22'
'AP02' 'AP03' 'AP04' 'AP05' 'AP06' 'AP07' 'AP08' 'AP09'
'AP10' 'AP11' 'AP12' 'AP13'
'TPH(-1)' 'TPH2(-1)'};
452 PRINT N;
453 PRINT B_FIXED(| ROWNAME=RF|);
454 PRINT R2, S2, SER, NT, NTS, BFN;
455 PRINT BLI;
456 PRINT H;
457 FINISH MAIN;
NOTE: Module MAIN defined.
458 RUN MAIN;
NOTE: I/O required temporary file to be opened.
NOTE: Reopening data set WORK.OPER1.
NOTE: I/O required temporary file to be opened.
NOTE: The data set WORK.BLIOUT has 1 observations and 1 variables.
Exiting IML.
NOTE: 2234 workspace compresses.
NOTE: The PROCEDURE IML used 1 minute 54.29 seconds.

459 DATA OPER1; SET OPER1;
460 INT=1;

NOTE: The data set WORK.OPER1 has 24781 observations and 38 variables.
NOTE: The DATA statement used 4.88 seconds.

461 DATA COUNT; SET OPER1;

NOTE: The data set WORK.COUNT has 24781 observations and 38 variables.
NOTE: The DATA statement used 3.83 seconds.

462 PROC MEANS NOPRINT;
463 BY IDNUM;
464 VAR TPH;
465 OUTPUT OUT=NOUT N=N;

NOTE: The data set WORK.NOUT has 309 observations and 4 variables.
NOTE: The PROCEDURE MEANS used 1.54 seconds.

466 PROC DATASETS LIBRARY=WORK;
-----Directory-----

| | |
|---------|------|
| Libref: | WORK |
| Engine: | V612 |

| # | Name | Memtype | Indexes |
|----|---------|---------|---------|
| 1 | BLIOUT | DATA | |
| 2 | BTREG | DATA | |
| 3 | BTSET | DATA | |
| 4 | BTWCOV | DATA | |
| 5 | COUNT | DATA | |
| 6 | IDEPS | DATA | |
| 7 | NOUT | DATA | |
| 8 | OLSEPS | DATA | |
| 9 | OPER1 | DATA | |
| 10 | PROFILE | CATALOG | |
| 11 | RBOTH | DATA | |
| 12 | RCROSS | DATA | |
| 13 | TIMEPS | DATA | |

```

467   DELETE COUNT;
468   ;
469   *%*****;
470   * PART V: ESTIMATING THE FIXED EFFECTS MODEL WITH THE SERIAL      ;
471   * CORRELATION CORRECTION IN PLACE. THE TRANSFORMATION IS DIFFERENT   ;
472   * FOR THE FIRST OBSERVATION FOR EACH SITE THAN THE REMAINING       ;
473   * OBSERVATIONS                                                 ;
474   *%*****;
475   ****;
476   ***      RE-ENTER PROC IML AND USE BLI RHO FOR SERIAL CORRELATION ***;
477   ***      CORRECTION IN PLACE. THE FIRST LINE IS USED TO ENSURE      ***;
478   ***      THERE IS ENOUGH SPACE TO ESTIMATE EQUATIONS                 ***;
479   ****;

```

NOTE: Deleting WORK.COUNT (memtype=DATA).

NOTE: The PROCEDURE DATASETS used 0.6 seconds.

```

480   PROC IML SYMSIZE=600000 WORKSIZE=6000000;
NOTE: Assuming that the number is given in bytes and not kilobytes.
NOTE: Assuming that the number is given in bytes and not kilobytes.
Worksize      = 6000000
Symbol size = 600000
IML Ready
481   SHOW SPACE;
482   RESET AUTONAME;
483   START MAIN;
484   USE NOUT VAR {N};           * READING IN THE # OF OBS PER SITE;
485   READ ALL INTO NN;          * N IS THE NUMBER OF TIME PERIODS PER SITE;
486   *READING IN THE DATA FOR THE RHS VARIABLES;
487   USE OPER1 VAR
488   {INT TPH TPH2 MANR MANR2 MANRTPH TIM1TPH TIM1MANR
489     TIME1 TIME12 TIM2TPH TIM2MANR TIME2 TIME22 AP02 AP03
490     AP04 AP05 AP06 AP07 AP08 AP09 AP10
491     AP11 AP12 AP13 TPH1 TPH21};

```

```

492 READ ALL INTO Z;                                * READING IN THE ESTIMATED RHO;      Attachment 2
492                                         ;      Page 18 of 20
493 USE BLIOUUT VAR {BLI};                         ;      to OCA/USPS-107-118
494 READ ALL INTO BLI;
495 USE OPER1 VAR {HRS};
495                                         * READING IN THE DEPENDENT VARIABLE;
496 READ ALL INTO Y;
497 **** THIS SECTION PROVIDES THE TRANSFORMATION OF THE DATA      ;
498 **** THAT IS USED IN THE SERIAL CORRELATION CORRECTION      ;
499 ****
500 ****
501 OB1=(1-BLI**2)**.5;                           *CONSTRUCTING THE TRANSFORMATION FOR 1ST OB;
502 K1=NCOL(Z);
503 NT=NROW(Y);                                     *NT IS THE TOTAL NUMBER OF OBSERVATIONS;
504 N=NROW(NN);                                     *N IS THE TOTAL NUMBER OF SITES;
505 TRZ=J(1,K1,{0});                               *CONSTRUCTING THE PLACEHOLDER MATRICES;
506 TRY=J(1,1,{0});
507 IN1=0;
508 IN2=0;
509 DO S=1 TO N BY 1;                            *IDENTIFYING THE OBSERVATIONS FOR THE jTH SITE;
510 TL=NN(|S,|);
511 IN1 = 1 + IN2;                                * CREATING BOUNDS FOR CURRENT AND LAGGED VECTORS;
512 IN2 = TL + IN2;
513 INYD1 = IN1 + 1;
514 INYD2 = IN2 - 1;
515 FRST  = Z(|IN1,|);                          * IDENTIFYING THE FIRST OB. FOR SITE J;
516 OTHER = Z(|INYD1:IN2,|);                      * IDENTIFYING THE SECOND THROUGH LAST OBS
516                                         FOR SITE J;
517 LAGOB = Z(|IN1:INYD2,|);                      * IDENTIFYING THE VECTOR OF LAG OBSERVATIONS
518                                         FOR SITE J;
519 FRSTY = Y(|IN1,|);                           * TRANSFORMING THE 1ST OBS FOR RHS VARIABLES;
520 OTHEY = Y(|INYD1:IN2,|);                      * TRANSFORMING THE 1ST OBS FOR LHS VARIABLE ;
521 LAGY  = Y(|IN1:INYD2,|);
522 FRST1 = FRST  * OB1;                         * TRANSFORMING INTERCEPT TERM;
523                                         ;      * TRANSFORMING THE;
524 FRSTY1= FRSTY * OB1;                         * NON-INTERCEPT RHS;
525 OTHER1= OTHER(|,1|) * (1-BLI);               * VARIABLES;
526 OTHER2= OTHER(|,2:K1|)-(BLI*LAGOB(|,2:K1|)); * CONCATINATING INTER. AND NON-INTERCEPT ;
527                                         ;      *
528                                         ;      *
529 OTHER3= OTHER1||OTHER2;                      * CONCATINATING INTER. AND NON-INTERCEPT ;
529                                         ;

```

530 OTHEY1= OTHEY - (BLI*LAGY); Attachment 2
 530 * TRANSFORM THE LHS VARIABLE; Page 19 of 20
 531 TRZ1=FRST1//OTHER3; to OCA/USPS-107-118
 531 * VERTICALLY CONCATINATING THE DATA FOR SITE j;
 532 TRY1=FRSTY1//OTHEY1;
 533 TRZ =TRZ//TRZ1;
 533 *VERTICALLY CONCATINATING THE DATA FOR ALL SITES;
 534 TRY =TRY//TRY1;
 535 END;
 536 NTS=NT;
 537 NTS1=NTS+1;
 538 TRZ=TRZ(|2:NTS1,|); *REMOVE PLACEHOLDER OBSERVATION;
 539 TRY=TRY(|2:NTS1,|);
 540 Z=TRZ;
 540 *REDEFINE MATRICES FOR ESTIMATION ;
 541 Y=TRY;
 542 FREE TRZ TRY TRZ1 TRY1 FRST1 FRSTY1 OTHER3 OTHEY1 OTHER2 OTHER3;
 543 K1=NCOL(Z);
 544 NTS= NROW(Y); *NTS IS THE TOTAL NUMBER OF OBS AFTER TRANSFORMATION;
 545 X= Z(|,2:K1|); * X MATRIX HAS NO INTERCEPT;
 546 K= NCOL(X);
 547 N1=N+{1};
 548 DFE = NTS - N -K;
 549 XDX= J(K,K,{0}); *INITIALIZING PLACE HOLDER MATRICES FOR REGRESSION;
 550 XDY= J(K,1,{0});
 551 DX= J(1,K,{0});
 552 DY= J(1,1,{0});
 553 I1={0};
 554 I2={0};
 555 * THIS SECTION IDENTIFIES THE DATA FOR EACH SITE j;
 556 DO S={1} TO N BY{ 1};
 557 T = NN(|S,|); * T IS THE # OF OBS FOR SITE j AFTER TRANSFORM;
 558 I1={ 1}+I2; * IDENTIFYING THE 1ST OBS FOR SITE j;
 559 I2=T+I2; * IDENFIFYING THE LAST OBS FOR SITE j;
 560 X1= X(|I1:I2,|); * ISOLATING THE DATA FOR SITE j;
 561 Y1= Y(|I1:I2,|);
 562 JT1 = J(T,1,{1});
 563 IT= I(T);
 564 D = IT - JT1*JT1`/T; * REMOVING THE SITE SPECIFIC EFFECTS;
 564
 565 DX1=D*X1;
 566 DY1=D*Y1;
 567 XDX=XDX+X1`*DX1;
 568 XDY=XDY+X1`*DY1;
 569 DX=DX//DX1; *VERTICALLY CONCATINATING THE DATA;

```
570      DY=DY//DY1;
571      END;
572      DX= DX(|2:NTS,|);
573      * ELIMINATING THE PLACEHOLDER OBSERVATION;
574      DY= DY(|2:NTS,|);
575      B_F= SOLVE(XDX,XDY);
576      * FIXED EFFECTS ETIMATOR: B_F=INV(XDX)*XDY;
577      RES_F = DY - DX*B_F;
578      * FIXED EFFECTS RESIDUALS ;
579      SSE_F = RES_F`*RES_F;
580      * FIXED EFFECTS SUM OF SQUARED ERROR;
581      S2    = SSE_F/DFE;
582      * FIXED EFFECTS REGRESSION VARIANCE;
583      SER   = SQRT(S2);
584      * FIXED EFFECTS STD ERROR OF THE REGRESSION;
585      VCV = INV(XDX) # S2;
586      * FIXED EFFECTS VAR/COVAR MATRIX;
587      STD_F= SQRT( VECDIAG(S2* INV(XDX)));
588      * CALCULATING THE STD ERR OF
589      ESTIMATES;
590      TTEST_F= B_F/STD_F;
591      * T-STAT OF COEFFICIENTS;
592      B_FIXED= B_F||TTEST_F;
593      NK1 = N*K1;
594      RF={'TPH' 'TPH2' 'MANR' 'MANR2' 'MANRTPH' 'TIME1TPH' 'TIME1MANR'
595      'TIME1' 'TIME12' 'TIME2TPH' 'TIME2MANR' 'TIME2' 'TIME22'
596      'AP02' 'AP03' 'AP04' 'AP05' 'AP06' 'AP07' 'AP08'
597      'AP09' 'AP10' 'AP11' 'AP12' 'AP13'
598      'TPH(-1)' 'TPH2(-1)'};
599      ** PRINTING OUT THE RESULTS ***:
600      PRINT N;
601      PRINT B_FIXED(| ROWNAME=RF| );
602      PRINT S2, SER, NTS, N;
603      PRINT VCV;
604      FINISH MAIN;
605      NOTE: Module MAIN defined.
606
607      RUN MAIN;
608      NOTE: I/O required temporary file to be opened.
609      NOTE: Reopening data set WORK.OPER1.
610      ****
611      ** END OF PROGRAM **;
```

MANUAL LETTER OPERATIONS/ HOURS ON TPH
USING ONLY CONTINUOUS DATA FROM 8801-9613
INCLUDING OFFICES @ LEAST 39 OBS/LAG MODEL
USES 12 AP DUMMIES TO CAPTURE SEASONAL EFFECTS

Attachment 3
Page 1 of 13
to OCA/USPS-107-118

12:30 Wednesday, November 12, 1997

| Variable | N | Mean | Std Dev | Minimum | Maximum |
|----------|-------|------------|------------|-------------|------------|
| TPH | 24781 | 9235.21 | 10569.05 | 281.6000000 | 127797.60 |
| TIME1 | 24781 | 16.3037004 | 22.9385838 | 0 | 65.0000000 |
| TIME2 | 24781 | 15.6329446 | 17.2731057 | 0 | 52.0000000 |
| HRS | 24781 | 16123.67 | 20611.04 | 296.0000000 | 191596.00 |
| MANR | 24781 | 0.1813266 | 0.2035047 | 0.0045678 | 1.0000000 |

MANUAL LETTER OPERATIONS/ HOURS ON TPH Attachment 3
 USING ONLY CONTINUOUS DATA FROM 8801-9613 Page 2 of 13
 INCLUDING OFFICES @ LEAST 39 OBS/LAG MODEL to OCA/USPS-107-118
 USES 12 AP DUMMIES TO CAPTURE SEASONAL EFFECTS

12:30 Wednesday, November 12, 1997

Model: MODEL1

Dependent Variable: HRS

Analysis of Variance

| Source | DF | Sum of Squares | Mean Square | F Value | Prob>F |
|----------|-------|----------------|-------------|-----------|--------|
| Model | 5 | 26847.24151 | 5369.44830 | 73970.121 | 0.0001 |
| Error | 24775 | 1798.40291 | 0.07259 | | |
| C Total | 24780 | 28645.64442 | | | |
| Root MSE | | 0.26942 | R-square | 0.9372 | |
| Dep Mean | | -0.57960 | Adj R-sq | 0.9372 | |
| C.V. | | -46.48482 | | | |

Parameter Estimates

| Variable | DF | Parameter Estimate | Standard Error | T for H0: Parameter=0 | Prob > T |
|----------|----|--------------------|----------------|-----------------------|-----------|
| INTERCEP | 1 | -0.246693 | 0.00295216 | -83.564 | 0.0001 |
| TPH | 1 | 1.095743 | 0.00226208 | 484.396 | 0.0001 |
| TPH2 | 1 | 0.050359 | 0.00156790 | 32.119 | 0.0001 |
| MANR | 1 | -0.325820 | 0.00366936 | -88.795 | 0.0001 |
| MANR2 | 1 | 0.056762 | 0.00249400 | 22.759 | 0.0001 |
| MANRTPH | 1 | -0.069039 | 0.00294992 | -23.404 | 0.0001 |

MANUAL LETTER OPERATIONS/ HOURS ON TPH
 USING ONLY CONTINUOUS DATA FROM 8801-9613
 INCLUDING OFFICES @ LEAST 39 OBS/LAG MODEL
 USES 12 AP DUMMIES TO CAPTURE SEASONAL EFFECTS

Attachment 3 3
 Page 3 of 13
 to OCA/USPS-107-11

12:30 Wednesday, November 12, 1997

Model: MODEL1

Dependent Variable: HRS

Analysis of Variance

| Source | DF | Sum of Squares | Mean Square | F Value | Prob>F |
|----------|-------|----------------|-------------|------------|--------|
| Model | 7 | 28062.73785 | 4008.96255 | 170377.270 | 0.0001 |
| Error | 24773 | 582.90657 | 0.02353 | | |
| C Total | 24780 | 28645.64442 | | | |
| Root MSE | | 0.15339 | R-square | 0.9797 | |
| Dep Mean | | -0.57960 | Adj R-sq | 0.9796 | |
| C.V. | | -26.46577 | | | |

Parameter Estimates

| Variable | DF | Parameter Estimate | Standard Error | T for H0: Parameter=0 | Prob > T |
|----------|----|--------------------|----------------|--------------------------|-----------|
| INTERCEP | 1 | -0.271507 | 0.00174700 | -155.413 | 0.0001 |
| TPH | 1 | 1.067856 | 0.00134893 | 791.632 | 0.0001 |
| TPH2 | 1 | 0.057029 | 0.00089325 | 63.844 | 0.0001 |
| MANR | 1 | -0.354277 | 0.00222260 | -159.398 | 0.0001 |
| MANR2 | 1 | 0.053728 | 0.00142899 | 37.599 | 0.0001 |
| MANRTPH | 1 | -0.091475 | 0.00175168 | -52.221 | 0.0001 |
| PORESID | 1 | 0.986153 | 0.00453793 | 217.313 | 0.0001 |
| TRESID | 1 | 0.904597 | 0.01923192 | 47.036 | 0.0001 |

MANUAL LETTER OPERATIONS/ HOURS ON TPH
USING ONLY CONTINUOUS DATA FROM 8801-9613
INCLUDING OFFICES @ LEAST 39 OBS/LAG MODEL
USES 12 AP DUMMIES TO CAPTURE SEASONAL EFFECTS

Attachment 3
Page 4 of 13
to OCA/USPS-107-118

12:30 Wednesday, November 12, 1997

Dependent Variable: HRS

Test: T1

Numerator: 1111.2027 DF: 1 F value:47225.106
Denominator: 0.02353 DF:24773 Prob>F: 0.0001

MANUAL LETTER OPERATIONS/ HOURS ON TPH
 USING ONLY CONTINUOUS DATA FROM 8801-9613
 INCLUDING OFFICES @ LEAST 39 OBS/LAG MODEL
 USES 12 AP DUMMIES TO CAPTURE SEASONAL EFFECTS

Attachment 3
 Page 5 of 13
 to OCA/USPS-107-118

12:30 Wednesday, November 12, 1997

Model: MODEL1

Dependent Variable: HRS

Analysis of Variance

| Source | DF | Sum of Squares | Mean Square | F Value | Prob>F |
|----------|-----|----------------|-------------|---------|--------|
| Model | 13 | 306.12652 | 23.54819 | 516.013 | 0.0001 |
| Error | 295 | 13.46228 | 0.04563 | | |
| C Total | 308 | 319.58880 | | | |
| Root MSE | | 0.21362 | R-square | 0.9579 | |
| Dep Mean | | -0.77711 | Adj R-sq | 0.9560 | |
| C.V. | | -27.48949 | | | |

Parameter Estimates

| Variable | DF | Parameter Estimate | Standard Error | T for H0: Parameter=0 | Prob > T |
|----------|----|--------------------|----------------|-----------------------|-----------|
| INTERCEP | 1 | -0.292849 | 0.02623270 | -11.164 | 0.0001 |
| TPH | 1 | 1.056163 | 0.02361002 | 44.734 | 0.0001 |
| TPH2 | 1 | 0.038748 | 0.01577948 | 2.456 | 0.0146 |
| MANR | 1 | -0.387262 | 0.03343349 | -11.583 | 0.0001 |
| MANR2 | 1 | 0.054527 | 0.02515539 | 2.168 | 0.0310 |
| MANRTPH | 1 | -0.114089 | 0.03028482 | -3.767 | 0.0002 |
| TIM1TPH | 1 | 0.002006 | 0.00767996 | 0.261 | 0.7942 |
| TIM1MANR | 1 | 0.003264 | 0.00679560 | 0.480 | 0.6313 |
| TIME1 | 1 | -0.011894 | 0.00748055 | -1.590 | 0.1129 |
| TIME12 | 1 | 0.000150 | 0.00031271 | 0.478 | 0.6327 |
| TIM2TPH | 1 | -0.004356 | 0.00861344 | -0.506 | 0.6135 |
| TIM2MANR | 1 | 0.007312 | 0.00795024 | 0.920 | 0.3585 |
| TIME2 | 1 | -0.019934 | 0.00789077 | -2.526 | 0.0121 |
| TIME22 | 1 | 0.000242 | 0.00039866 | 0.606 | 0.5447 |

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| M | T | N | D | E | R | I | N | T | M | A |
|---|---|---|---|---|---|---|---|---|---|---|
| O | D | E | P | V | M | R | E | | | |
| B | L | E | E | R | E | E | | T | M | A |
| S | - | - | - | - | - | P | H | P | A | N |
| | | | | | | H | 2 | H | N | R |
| | | | | | | | | R | 2 | P |
| | | | | | | | | | | H |

| | | | | | | | | | | | |
|----|--------|-------|----------|---------|----------|----------|----------|-----------|----------|-----------|----------|
| 1 | MODEL1 | PARMS | HRS | 0.21362 | -0.29285 | 1.05616 | 0.038748 | -0.38726 | 0.054527 | -0.11409 | |
| 2 | MODEL1 | COV | INTERCEP | HRS | 0.21362 | 0.00069 | 0.00008 | -0.000106 | 0.00045 | -0.000253 | 0.00027 |
| 3 | MODEL1 | COV | TPH | HRS | 0.21362 | 0.00008 | 0.00056 | 0.000220 | 0.00023 | 0.000179 | 0.00027 |
| 4 | MODEL1 | COV | TPH2 | HRS | 0.21362 | -0.00011 | 0.00022 | 0.000249 | -0.00004 | 0.000045 | -0.00002 |
| 5 | MODEL1 | COV | MANR | HRS | 0.21362 | 0.00045 | 0.00023 | -0.000038 | 0.00112 | 0.000021 | 0.00081 |
| 6 | MODEL1 | COV | MANR2 | HRS | 0.21362 | -0.00025 | 0.00018 | 0.000045 | 0.00002 | 0.000633 | 0.00014 |
| 7 | MODEL1 | COV | MANRTPH | HRS | 0.21362 | 0.00027 | 0.00027 | -0.000020 | 0.00081 | 0.000137 | 0.00092 |
| 8 | MODEL1 | COV | TIM1TPH | HRS | 0.21362 | 0.00002 | 0.00004 | 0.000062 | -0.00001 | 0.000002 | -0.00003 |
| 9 | MODEL1 | COV | TIM1MANR | HRS | 0.21362 | 0.00001 | 0.00002 | 0.000005 | 0.00002 | -0.000020 | 0.00006 |
| 10 | MODEL1 | COV | TIME1 | HRS | 0.21362 | 0.00001 | 0.00005 | 0.000037 | -0.00001 | -0.000016 | -0.00000 |
| 11 | MODEL1 | COV | TIME12 | HRS | 0.21362 | 0.00000 | -0.00000 | -0.000001 | 0.00000 | 0.000000 | 0.00000 |
| 12 | MODEL1 | COV | TIM2TPH | HRS | 0.21362 | 0.00004 | 0.00006 | 0.000078 | 0.00001 | 0.000008 | 0.00001 |
| 13 | MODEL1 | COV | TIM2MANR | HRS | 0.21362 | -0.00001 | 0.00003 | 0.000008 | 0.00003 | 0.000010 | 0.00009 |
| 14 | MODEL1 | COV | TIME2 | HRS | 0.21362 | 0.00003 | 0.00008 | 0.000047 | 0.00001 | -0.000000 | 0.00002 |

| T | I | M | T | I | M | T | I | M | T | I |
|---|---|---|---|---|---|---|---|---|---|---|
| T | I | M | T | I | M | T | I | M | T | I |
| I | M | 1 | T | I | M | 2 | T | I | M | I |
| M | 1 | | I | M | 2 | M | I | M | E | H |
| 1 | M | | M | E | 1 | P | N | E | 2 | R |
| O | T | A | M | | | T | A | M | E | |
| B | P | N | E | | | | | | 2 | |
| S | H | R | 1 | 2 | | H | R | 2 | 2 | S |

| | | | | | | | | | |
|----|-----------|-----------|-----------|------------|-----------|-----------|-----------|------------|----|
| 1 | 0.0020056 | 0.0032643 | -0.011894 | 0.00014961 | -.0043557 | 0.0073122 | -0.019934 | 0.00024177 | -1 |
| 2 | 0.0000182 | 0.0000098 | 0.000013 | 0.00000028 | 0.0000352 | -.0000055 | 0.000028 | -0.0000212 | . |
| 3 | 0.0000368 | 0.0000177 | 0.000049 | -.00000004 | 0.0000622 | 0.0000335 | 0.000082 | 0.00000032 | . |
| 4 | 0.0000617 | 0.0000050 | 0.000037 | -.00000136 | 0.0000777 | 0.0000082 | 0.000047 | 0.00000158 | . |
| 5 | -.0000113 | 0.0000155 | -0.000014 | 0.00000076 | 0.0000143 | 0.0000322 | 0.000014 | -.00000082 | . |
| 6 | 0.0000020 | -.0000203 | -0.000016 | 0.00000001 | 0.0000084 | 0.0000097 | -0.000000 | -.00000027 | . |
| 7 | -.0000268 | 0.0000607 | -0.000004 | 0.00000096 | 0.0000052 | 0.0000933 | 0.000023 | -.00000056 | . |
| 8 | 0.0000590 | 0.0000048 | 0.000041 | -.00000128 | 0.0000626 | 0.0000011 | 0.000040 | 0.00000116 | . |
| 9 | 0.0000048 | 0.0000462 | 0.000013 | -.00000067 | 0.0000057 | 0.0000505 | 0.000015 | 0.00000076 | . |
| 10 | 0.0000407 | 0.0000131 | 0.000056 | -.00000077 | 0.0000404 | 0.0000123 | 0.000055 | 0.00000093 | . |
| 11 | -.0000013 | -.0000007 | -0.000001 | 0.00000010 | -.0000013 | -.0000005 | -0.000001 | -.00000011 | . |
| 12 | 0.0000626 | 0.0000057 | 0.000040 | -.00000131 | 0.0000742 | 0.0000037 | 0.000045 | 0.00000125 | . |
| 13 | 0.0000011 | 0.0000505 | 0.000012 | -.00000051 | 0.0000037 | 0.0000632 | 0.000016 | 0.00000084 | . |
| 14 | 0.0000399 | 0.0000146 | 0.000055 | -.00000076 | 0.0000452 | 0.0000165 | 0.000062 | 0.00000091 | . |

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| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M | O | D | O | B | S | | | I | | M | |
| - | T | - | N | P | V | R | E | N | T | A | A |
| M | Y | A | P | M | A | S | C | E | P | M | N |
| D | E | P | M | A | S | C | T | P | H | A | R |
| O | L | E | E | R | E | E | P | H | 2 | N | T |
| B | - | - | - | - | - | - | P | H | R | R | P |
| S | - | - | - | - | - | - | | | | 2 | H |

15 MODEL1 COV TIME22 HRS 0.21362 -0.00000 0.00000 0.000002 -0.00000 -0.000000 -0.000000 -0.000000

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|--|--|--|--|---|
| T | I | T | I | T | I | T | | | | | |
| T | M | | | T | I | M | | | | | T |
| I | M | | | I | M | 2 | | | | | I |
| M | 1 | T | I | M | 2 | M | | | | | M |
| 1 | M | I | M | E | T | A | | | | | E |
| O | T | A | M | E | 1 | P | | | | | H |
| B | P | N | E | 1 | P | N | | | | | R |
| S | H | R | 1 | 2 | H | R | | | | | S |

15 0.0000012 0.0000008 0.000001 -0.00000011 0.0000012 0.0000008 0.000001 0.00000016 .

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Memory Usage (in bytes):

| | | |
|--------------------------|-------------|------------------|
| Symbol Space | Size 131056 | Available 130032 |
| Extent 1 | Size 131056 | Available 131032 |
| Number of compresses = 0 | | |

N COL1

ROW1 309

B_FIXED COL1 COL2

| | | |
|----------|-----------|-----------|
| TPH | 0.6179662 | 69.950358 |
| TPH2 | -0.007438 | -2.579301 |
| MANR | -0.047159 | -8.302616 |
| MANR | -0.009228 | -3.728913 |
| MANRTPH | 0.0048685 | 1.5772349 |
| TIME1TP | -0.00024 | -4.368536 |
| TIM1MAN | 0.0004119 | 6.0680717 |
| TIME1 | -0.001371 | -10.76732 |
| TIME12 | -6.059E-6 | -1.51596 |
| TIME2TP | -0.000033 | -0.418095 |
| TIM2MAN | 0.000132 | 1.1553539 |
| TIME2 | -0.000501 | -3.196173 |
| TIME22 | 0.0000557 | 10.056562 |
| AP02 | 0.0190548 | 4.0609068 |
| AP03 | 0.0754563 | 16.21069 |
| AP04 | 0.1526823 | 32.437354 |
| AP05 | 0.0548951 | 11.256478 |
| AP06 | 0.0356685 | 7.6140683 |
| AP07 | 0.0207981 | 4.4611547 |
| AP08 | 0.014074 | 3.0218557 |
| AP09 | 0.0103268 | 2.1915121 |
| AP10 | 0.0008901 | 0.1891921 |
| AP11 | -0.01564 | -3.319362 |
| AP12 | -0.002852 | -0.608421 |
| AP13 | -0.006012 | -1.281983 |
| TPH(-1) | -0.029414 | -3.833578 |
| TPH2(-1) | 0.0182223 | 6.8238586 |

R2 COL1

ROW1 0.9836991

S2 COL1

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ROW1 0.019102

SER COL1

ROW1 0.1382101

NT COL1

ROW1 24781

NTS COL1

ROW1 24781

BFN COL1

ROW1 0.5133067

BLI COL1

ROW1 0.7367927

H COL1

ROW1 1012.7726

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Memory Usage (in bytes):

| | | |
|--------------------------|--------------|-------------------|
| Symbol Space | Size 600000 | Available 598976 |
| Extent 1 | Size 6000000 | Available 5999976 |
| Number of compresses = 0 | | |

| B_FIXED | COL1 | COL2 |
|---------|------|------|
|---------|------|------|

| | | |
|----------|-----------|-----------|
| TPH | 0.7717603 | 118.50164 |
| TPH2 | -0.012957 | -6.156967 |
| MANR | -0.166282 | -23.43072 |
| MANR2 | -0.007143 | -2.545642 |
| MANRTPH | 0.0137408 | 3.8093761 |
| TIME1TPH | -0.000217 | -2.728409 |
| TIM1MANR | 0.0001672 | 1.7608672 |
| TIME1 | -0.001089 | -4.271162 |
| TIME12 | 8.2993E-6 | 1.0389372 |
| TIME2TPH | -0.000427 | -3.083865 |
| TIM2MANR | 0.0005563 | 2.9696908 |
| TIME2 | 0.0008345 | 3.2593814 |
| TIME22 | -0.000021 | -2.114247 |
| AP02 | 0.002038 | 0.8582083 |
| AP03 | 0.0519453 | 17.078531 |
| AP04 | 0.1229156 | 34.791515 |
| AP05 | 0.0213397 | 5.6149104 |
| AP06 | 0.0227491 | 5.9025251 |
| AP07 | 0.0119892 | 3.0600718 |
| AP08 | 0.0069257 | 1.7644296 |
| AP09 | 0.0101451 | 2.6051391 |
| AP10 | 0.008698 | 2.2968382 |
| AP11 | -0.002946 | -0.821535 |
| AP12 | 0.0074892 | 2.3367164 |
| AP13 | 0.0000792 | 0.0306538 |
| TPH(-1) | 0.0253656 | 5.3803984 |
| TPH2(-1) | 0.007676 | 4.444066 |

| | |
|----|------|
| S2 | COL1 |
|----|------|

| | |
|------|-----------|
| ROW1 | 0.0085146 |
|------|-----------|

| | |
|-----|------|
| SER | COL1 |
|-----|------|

| | |
|------|-----------|
| ROW1 | 0.0922744 |
|------|-----------|

| | |
|-----|------|
| NTS | COL1 |
|-----|------|

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ROW1 24781

N COL1

ROW1 309

| | | | | | | | | | |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| VCV | COL1 | COL2 | COL3 | COL4 | COL5 | COL6 | COL7 | COL8 | COL9 |
| : | COL10 | COL11 | COL12 | COL13 | COL14 | COL15 | COL16 | COL17 | COL18 |
| : | COL19 | COL20 | COL21 | COL22 | COL23 | COL24 | COL25 | COL26 | COL27 |

| | | | | | | | | | |
|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| ROW1 | 0.0000424 | 9.8677E-6 | -0.000029 | 3.6778E-6 | -0.00001 | 4.0379E-8 | 7.0334E-9 | 1.046E-7 | -2.573E-9 |
| : | 9.2284E-8 | -5.878E-8 | -2.097E-7 | 3.276E-9 | 4.1892E-7 | -6.672E-7 | -2.016E-6 | -5.984E-7 | 1.4166E-6 |
| : | 1.3929E-6 | 1.4285E-6 | 3.1118E-6 | 3.5947E-6 | 3.9373E-6 | 3.1983E-6 | 2.6455E-6 | -2.409E-6 | -5.517E-7 |

| | | | | | | | | | |
|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| ROW2 | 9.8677E-6 | 4.4287E-6 | -7.038E-6 | 6.2131E-7 | -3.772E-6 | 2.0034E-8 | 1.0308E-9 | 4.1545E-8 | -7.97E-10 |
| : | 1.1421E-8 | -6.141E-9 | -1.252E-8 | -3.01E-10 | 4.2161E-8 | -2.488E-7 | -4.246E-7 | -8.268E-8 | 2.4659E-7 |
| : | 1.9729E-7 | 2.6177E-7 | 5.796E-7 | 5.6061E-7 | 6.0948E-7 | 5.4038E-7 | 4.5623E-7 | -5.748E-7 | 2.235E-7 |

| | | | | | | | | | |
|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| ROW3 | -0.000029 | -7.038E-6 | 0.0000504 | 1.3289E-6 | 0.0000163 | 1.8138E-8 | 2.8907E-9 | -9.413E-8 | 5.1658E-9 |
| : | 6.9276E-9 | 2.0925E-7 | 5.7643E-7 | -1.014E-8 | -6.486E-7 | -4.076E-7 | -2.218E-6 | 5.0103E-7 | -1.817E-6 |
| : | -1.531E-6 | -1.566E-6 | -2.512E-6 | -2.674E-6 | -2.717E-6 | -2.408E-6 | -2.75E-6 | 1.2638E-6 | 3.5255E-7 |

| | | | | | | | | | |
|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| ROW4 | 3.6778E-6 | 6.2131E-7 | 1.3289E-6 | 7.8741E-6 | -2.763E-6 | 2.8005E-9 | -4.621E-8 | 2.3484E-8 | -1.239E-9 |
| : | -2.976E-8 | 1.0786E-7 | 6.4377E-8 | -1.143E-9 | -1.071E-7 | -2.366E-7 | -3.588E-7 | -3.905E-7 | -3.762E-8 |
| : | -1.657E-8 | 2.4184E-9 | 1.4426E-7 | 1.4326E-7 | 2.6888E-7 | 2.7893E-7 | 3.1991E-7 | -2.35E-8 | -1.511E-7 |

| | | | | | | | | | |
|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| ROW5 | -0.00001 | -3.772E-6 | 0.0000163 | -2.763E-6 | 0.000013 | -9.811E-9 | 2.5431E-8 | 5.8967E-9 | 5.12E-10 |
| : | 7.2102E-8 | -1.929E-9 | 1.6718E-7 | -2.148E-9 | -8.739E-8 | 1.1817E-8 | -4.126E-7 | 8.2869E-8 | -6.888E-7 |
| : | -6.043E-7 | -6.989E-7 | -1.178E-6 | -1.321E-6 | -1.405E-6 | -1.169E-6 | -1.075E-6 | 1.5069E-7 | -1.033E-7 |

| | | | | | | | | | |
|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| ROW6 | 4.0379E-8 | 2.0034E-8 | 1.8138E-8 | 2.8005E-9 | -9.811E-9 | 6.3025E-9 | 2.056E-10 | 2.2552E-9 | 6.16E-11 |
| : | 4.9015E-9 | -4.03E-10 | 1.7036E-9 | 3.943E-11 | 1.6226E-9 | 1.1739E-9 | -1.75E-9 | -4.96E-10 | 2.8022E-9 |
| : | 5.301E-9 | 4.3187E-9 | 7.7498E-9 | 7.5086E-9 | 1.0673E-8 | 8.6947E-9 | 4.026E-9 | 2.7839E-8 | 9.3069E-9 |

| | | | | | | | | | |
|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| ROW7 | 7.0334E-9 | 1.0308E-9 | 2.8907E-9 | -4.621E-8 | 2.5431E-8 | 2.056E-10 | 9.0145E-9 | 8.508E-10 | 5.789E-11 |
| : | -2.97E-10 | 7.3919E-9 | 9.481E-10 | 6.227E-11 | 1.1885E-9 | -6.5E-10 | 8.178E-10 | -1.61E-9 | -5.44E-10 |
| : | 3.966E-10 | 3.215E-11 | 1.1384E-9 | 3.0848E-9 | 5.1879E-9 | 4.0921E-9 | 4.848E-11 | 1.0283E-8 | 2.2444E-9 |

| | | | | | | | | | |
|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| ROW8 | 1.046E-7 | 4.1545E-8 | -9.413E-8 | 2.3484E-8 | 5.8967E-9 | 2.2552E-9 | 8.508E-10 | 6.4995E-8 | -1.849E-9 |
| : | 5.4565E-9 | -1.244E-9 | 3.5079E-8 | -8.45E-10 | 3.5658E-8 | 1.1081E-8 | -6.551E-9 | -2.859E-8 | -3.648E-8 |
| : | -4.548E-8 | -4.908E-8 | -4.63E-8 | -4.557E-8 | -3.961E-8 | -2.838E-8 | -1.084E-8 | -5.48E-9 | 2.6269E-8 |

| | | | | | | | | | |
|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| ROW9 | -2.573E-9 | -7.97E-10 | 5.1658E-9 | -1.239E-9 | 5.12E-10 | 6.16E-11 | 5.789E-11 | -1.849E-9 | 6.381E-11 |
| : | -1.02E-10 | 9.779E-11 | -7.7E-10 | 1.963E-11 | -1.245E-9 | -7.75E-10 | -6.75E-10 | -9.72E-11 | 7.291E-11 |
| : | 2.571E-10 | 1.527E-10 | -2.6E-11 | -1.98E-10 | -4.61E-10 | -1.024E-9 | -1.928E-9 | 1.8925E-9 | -2.06E-10 |

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| | | | | | | | | | | |
|-------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--|
| ROW10 | 9.2284E-8 | 1.1421E-8 | 6.9276E-9 | -2.976E-8 | 7.2102E-8 | 4.9015E-9 | -2.97E-10 | 5.4565E-9 | -1.02E-10 | |
| : | 1.9165E-8 | -4.491E-9 | 6.9502E-9 | 5.248E-11 | 2.577E-10 | 3.2285E-9 | -1.817E-8 | -1.23E-8 | -1.715E-9 | |
| : | -1.35E-11 | 1.1114E-9 | 1.4948E-9 | 1.4631E-8 | 1.7994E-8 | 1.7313E-8 | 1.4753E-8 | 8.7054E-8 | 2.4986E-8 | |
| ROW11 | -5.878E-8 | -6.141E-9 | 2.0925E-7 | 1.0786E-7 | -1.929E-9 | -4.03E-10 | 7.3919E-9 | -1.244E-9 | 9.779E-11 | |
| : | -4.491E-9 | 3.5093E-8 | 9.5978E-9 | 1.81E-10 | 7.8108E-9 | 6.8014E-9 | -6.241E-9 | 9.7375E-9 | 9.5385E-9 | |
| : | 7.7688E-9 | 1.0515E-8 | 6.5779E-9 | 6.0078E-9 | 8.8312E-9 | 6.7003E-9 | -6.353E-9 | 4.4596E-8 | 8.8681E-9 | |
| ROW12 | -2.097E-7 | -1.252E-8 | 5.7643E-7 | 6.4377E-8 | 1.6718E-7 | 1.7036E-9 | 9.481E-10 | 3.5079E-8 | -7.7E-10 | |
| : | 6.9502E-9 | 9.5978E-9 | 6.5554E-8 | -1.672E-9 | 3.202E-8 | 1.769E-8 | -3.842E-8 | -1.66E-8 | -4.643E-8 | |
| : | -5.581E-8 | -6.296E-8 | -7.75E-8 | -8E-8 | -8.155E-8 | -7.641E-8 | -7.868E-8 | 1.0707E-7 | 6.84E-8 | |
| ROW13 | 3.276E-9 | -3.01E-10 | -1.014E-8 | -1.143E-9 | -2.148E-9 | 3.943E-11 | 6.227E-11 | -8.45E-10 | 1.963E-11 | |
| : | 5.248E-11 | 1.81E-10 | -1.672E-9 | 9.49E-11 | -2.4E-10 | 8.121E-10 | 2.3397E-9 | 2.3196E-9 | 2.9693E-9 | |
| : | 3.044E-9 | 3.0041E-9 | 2.8367E-9 | 2.5463E-9 | 2.1125E-9 | 1.3723E-9 | 5.948E-10 | -1.959E-9 | -1.602E-9 | |
| ROW14 | 4.1892E-7 | 4.2161E-8 | -6.486E-7 | -1.071E-7 | -8.739E-8 | 1.6226E-9 | 1.1885E-9 | 3.5658E-8 | -1.245E-9 | |
| : | 2.577E-10 | 7.8108E-9 | 3.202E-8 | -2.4E-10 | 5.6391E-6 | 4.7958E-6 | 4.2644E-6 | 3.9046E-6 | 3.4462E-6 | |
| : | 3.1135E-6 | 2.834E-6 | 2.5827E-6 | 2.254E-6 | 1.8994E-6 | 1.4641E-6 | 9.547E-7 | -1E-6 | -1.986E-7 | |
| ROW15 | -6.672E-7 | -2.488E-7 | -4.076E-7 | -2.366E-7 | 1.1817E-8 | 1.1739E-9 | -6.5E-10 | 1.1081E-8 | -7.75E-10 | |
| : | 3.2285E-9 | 6.8014E-9 | 1.769E-8 | 8.121E-10 | 4.7958E-6 | 9.2511E-6 | 8.0959E-6 | 7.113E-6 | 6.2329E-6 | |
| : | 5.578E-6 | 5.0265E-6 | 4.4766E-6 | 3.8946E-6 | 3.2563E-6 | 2.5132E-6 | 1.6146E-6 | -8.412E-7 | -1.917E-7 | |
| ROW16 | -2.016E-6 | -4.246E-7 | -2.218E-6 | -3.588E-7 | -4.126E-7 | -1.75E-9 | 8.178E-10 | -6.551E-9 | -6.75E-10 | |
| : | -1.817E-8 | -6.241E-9 | -3.842E-8 | 2.3397E-9 | 4.2644E-6 | 8.0959E-6 | 0.0000125 | 0.0000105 | 8.9636E-6 | |
| : | 7.8554E-6 | 6.9726E-6 | 6.0627E-6 | 5.1237E-6 | 4.1892E-6 | 3.2227E-6 | 2.1291E-6 | -1.787E-6 | -4.364E-7 | |
| ROW17 | -5.984E-7 | -8.268E-8 | 5.0103E-7 | -3.905E-7 | 8.2869E-8 | -4.96E-10 | -1.61E-9 | -2.859E-8 | -9.72E-11 | |
| : | -1.23E-8 | 9.7375E-9 | -1.66E-8 | 2.3196E-9 | 3.9046E-6 | 7.113E-6 | 0.0000105 | 0.0000144 | 0.0000118 | |
| : | 0.0000102 | 8.8744E-6 | 7.7414E-6 | 6.4759E-6 | 5.2646E-6 | 3.9405E-6 | 2.4921E-6 | -4.271E-6 | -8.575E-7 | |
| ROW18 | 1.4166E-6 | 2.4659E-7 | -1.817E-6 | -3.762E-8 | -6.888E-7 | 2.8022E-9 | -5.44E-10 | -3.648E-8 | 7.291E-11 | |
| : | -1.715E-9 | 9.5385E-9 | -4.643E-8 | 2.9693E-9 | 3.4462E-6 | 6.2329E-6 | 8.9636E-6 | 0.0000118 | 0.0000149 | |
| : | 0.0000126 | 0.0000108 | 9.2963E-6 | 7.8719E-6 | 6.4682E-6 | 4.8975E-6 | 3.1208E-6 | -1.514E-6 | -3.35E-7 | |
| ROW19 | 1.3929E-6 | 1.9729E-7 | -1.531E-6 | -1.657E-8 | -6.043E-7 | 5.301E-9 | 3.966E-10 | -4.548E-8 | 2.571E-10 | |
| : | -1.35E-11 | 7.7688E-9 | -5.581E-8 | 3.044E-9 | 3.1135E-6 | 5.578E-6 | 7.8554E-6 | 0.0000102 | 0.0000126 | |
| : | 0.0000154 | 0.0000129 | 0.0000109 | 9.0825E-6 | 7.3781E-6 | 5.5389E-6 | 3.4863E-6 | -9.16E-7 | -2.638E-7 | |
| ROW20 | 1.4285E-6 | 2.6177E-7 | -1.566E-6 | 2.4184E-9 | -6.989E-7 | 4.3187E-9 | 3.215E-11 | -4.908E-8 | 1.527E-10 | |
| : | 1.1114E-9 | 1.0515E-8 | -6.296E-8 | 3.0041E-9 | 2.834E-6 | 5.0265E-6 | 6.9726E-6 | 8.8744E-6 | 0.0000108 | |
| : | 0.0000129 | 0.0000154 | 0.0000127 | 0.0000104 | 8.3266E-6 | 6.1715E-6 | 3.8425E-6 | -7.294E-7 | -2.397E-7 | |
| ROW21 | 3.1118E-6 | 5.796E-7 | -2.512E-6 | 1.4426E-7 | -1.178E-6 | 7.7498E-9 | 1.1384E-9 | -4.63E-8 | -2.6E-11 | |
| : | 1.4948E-9 | 6.5779E-9 | -7.75E-8 | 2.8367E-9 | 2.5827E-6 | 4.4766E-6 | 6.0627E-6 | 7.7414E-6 | 9.2963E-6 | |
| : | 0.0000109 | 0.0000127 | 0.0000152 | 0.0000122 | 9.597E-6 | 6.9991E-6 | 4.3165E-6 | -8.056E-7 | -2.204E-7 | |

MANUAL LETTER OPERATIONS/ HOURS ON TPH
USING ONLY CONTINUOUS DATA FROM 8801-9613
INCLUDING OFFICES @ LEAST 39 OBS/LAG MODEL
USES 12 AP DUMMIES TO CAPTURE SEASONAL EFFECTS

Attachment 3
Page 13 of 13
to OCA/USPS-107-118

12:30 Wednesday, November 12, 199

ROW22 3.5947E-6 5.6061E-7 -2.674E-6 1.4326E-7 -1.321E-6 7.5086E-9 3.0848E-9 -4.557E-8 -1.98E-10
: 1.4631E-8 6.0078E-9 -8E-8 2.5463E-9 2.254E-6 3.8946E-6 5.1237E-6 6.4759E-6 7.8719E-6
: 9.0825E-6 0.0000104 0.0000122 0.0000143 0.0000111 7.9483E-6 4.8091E-6 2.062E-7 -9.331E-8

ROW23 3.9373E-6 6.0948E-7 -2.717E-6 2.6888E-7 -1.405E-6 1.0673E-8 5.1879E-9 -3.961E-8 -4.61E-10
: 1.7994E-8 8.8312E-9 -8.155E-8 2.1125E-9 1.8994E-6 3.2563E-6 4.1892E-6 5.2646E-6 6.4682E-6
: 7.3781E-6 8.3266E-6 9.597E-6 0.0000111 0.0000129 9.0359E-6 5.3467E-6 6.1846E-7 -1.065E-7

ROW24 3.1983E-6 5.4038E-7 -2.408E-6 2.7893E-7 -1.169E-6 8.6947E-9 4.0921E-9 -2.838E-8 -1.024E-9
: 1.7313E-8 6.7003E-9 -7.641E-8 1.3723E-9 1.4641E-6 2.5132E-6 3.2227E-6 3.9405E-6 4.8975E-6
: 5.5389E-6 6.1715E-6 6.9991E-6 7.9483E-6 9.0359E-6 0.0000103 5.9199E-6 8.9461E-7 -3.736E-8

ROW25 2.6455E-6 4.5623E-7 -2.75E-6 3.1991E-7 -1.075E-6 4.026E-9 4.848E-11 -1.084E-8 -1.928E-9
: 1.4753E-8 -6.353E-9 -7.868E-8 5.948E-10 9.547E-7 1.6146E-6 2.1291E-6 2.4921E-6 3.1208E-6
: 3.4863E-6 3.8425E-6 4.3165E-6 4.8091E-6 5.3467E-6 5.9199E-6 6.6761E-6 3.7071E-7 -3.166E-8

ROW26 -2.409E-6 -5.748E-7 1.2638E-6 -2.35E-8 1.5069E-7 2.7839E-8 1.0283E-8 -5.48E-9 1.8925E-9
: 8.7054E-8 4.4596E-8 1.0707E-7 -1.959E-9 -1E-6 -8.412E-7 -1.787E-6 -4.271E-6 -1.514E-6
: -9.16E-7 -7.294E-7 -8.056E-7 2.062E-7 6.1846E-7 8.9461E-7 3.7071E-7 0.0000222 5.4092E-6

ROW27 -5.517E-7 2.235E-7 3.5255E-7 -1.511E-7 -1.033E-7 9.3069E-9 2.2444E-9 2.6269E-8 -2.06E-10
: 2.4986E-8 8.8681E-9 6.84E-8 -1.602E-9 -1.986E-7 -1.917E-7 -4.364E-7 -8.575E-7 -3.35E-7
: -2.638E-7 -2.397E-7 -2.204E-7 -9.331E-8 -1.065E-7 -3.736E-8 -3.166E-8 5.4092E-6 2.9834E-6

CERTIFICATE OF SERVICE

I hereby certify that I have this date served the foregoing document upon all participants of record in this proceeding in accordance with section 12 of the rules of practice.



KENNETH E. RICHARDSON
Attorney

Washington, D.C. 20268-0001
November 12, 1997